PRICE JUN 29 1900 SECOND COPY. 25 CENTS

The Automobile Magazine

12565

ILLUSTRATED

Library of Congress
TWO COPIES RECEIVED
JUN 29 1900
Copyright entry
No.
2nd Copy Delivered to
PERIODICAL DIVISION

VOL. II JULY 1900 No. 4

The United States Industrial Publishing Company
21 State Street New York City U. S. A.

The "*Locomobile*" Company of America is now ready to turn out in large quantities a new and improved "*Locomobile*" which is the result of one year's experience.

1,000 "*Locomobiles*" are in actual use, all giving excellent satisfaction.

The following are some of the most important changes and alterations which have been made in the new model:—

50 per cent. increase in the water supply; larger and heavier fuel tank; larger and heavier air tank; wider tread; wider seat; wider body; side steering lever; auxiliary throttle valve and locking device; self-feeding oil cup for the cylinders; safety valve blows off in the water tank without noise.

Delivery in 30 days.
Illustrated Catalogue and interesting printed matter mailed on application.

BRANCHES:

76th St. and Broadway, N. Y.
7 E. 39th St., N. Y.
97-99 Greenwich St., N. Y.
Arcade, 71 Broadway, N. Y.
249-251 N. Broad St. Philadelphia, Pa.
1026 Connecticut Ave., Washington, D. C.

Style No. 2, $750, F. O. B., Bridgeport, Conn.

FOREIGN REPRESENTATIVES:

American Automobile and Motor Co., Ltd., 19 Rue Duret, Paris.

E. J. Halsey, 52 Sussex Pl., So. Kensington, London.

Address all inquiries to

The "*Locomobile*" Company of America 11 BROADWAY NEW YORK.

Paris Exposition
Automobile Festival at Vincennes
"Gymkhana"

The Automobile
MAGAZINE

VOL. 11 JULY 1900 NO. 4

Automobile Festivals at the Exposition

ON Sunday morning, May 27, sleepy old Vincennes was awakened rudely by the noisy clang of five hundred automobile-gongs. From all directions carriages came to take part in the festival which was to be held on that day. There were speedy little motocycles; voiturettes of all shapes and sizes; puffing steam-carriages, and heavy electric omnibuses. Never before had so many vehicles been gathered in one spot, and never were the good citizens of Paris more completely convinced that the automobile had permanently entered into their daily life.

That the festival at Vincennes was a great success goes without saying. The first number on the programme was a "gymkhana," a kind of automobile cotillon in which the carriages had to perform feats well-nigh incredible. The *chauffeurs* struck at painted pasteboard heads, as they filed past at full speed; they drove their machines through rings, as if mounted upon circus-horses; they took part in egg-races, needle-races, handkerchief-races, basket-races, tub-races, and almost every possible kind of contest that can be conceived.

After the "gymkhana," there were other contests which required no less dexterity on the part of the *chauffeurs*. After each man had shown the judges in a special trial how gracefully he could guide his vehicle, the automobilists were lined up for a quick-braking contest. At a given signal, the carriages all shot forward at full speed; and at another signal from one of the judges, each *chauffeur* endeavored to bring his car to a stop as quickly as possible. So skillful were some of the contestants,

Copyright, 1900, by U. S. Industrial Publishing Co. All rights reserved.

Ring Sticking

that they were able to brake their carriages within a few yards.

After the trials were over the judges distributed prizes, and the victorious *chauffeurs* filed before the flower-bedecked vehicles of their admiring friends, collected around Lake Daumesnil.

Festivals of this nature are by no means rare in France. "Gymkhanas" have been held at the Tuileries and at Pau. But without a doubt, no fête has ever been more successful than that at Vincennes. It remains to be seen whether American automobilists will follow the example of their French brethren and inaugurate similar festivals in the United States. "Gymkhanas" are fully as exciting as races and decidedly more amusing.

Among the prominent automobilists attending the fête the following were noticed:

Baron de Zuylen, President of the Automobile Club of France; Mr. Ch. Jeantaud, Mr. L. W. Ravenez, Mr. G. de Chasseloup-Laubat, Mr. Lafitte, Mr. de Dietrich, Messrs. Michelin, Mr. Lemaitre, Mr. Krieger, Mr. Mouter, Mr. Georges Richard, and Mr. Archdeacon.

Also the following members of the Automobile Club of America:

Mr. John H. Flagler, Mr. C. J. Dinsmore, Mr. Alexander Winton, Mr. Jefferson Seligman, Mr. Louis Stern, Mr. Roland R. Conklin, Mr. Charles S. Weston, Mr. D. E. Stone, Mr. C. J. Field and Mr. Albert C. Bostwick.

Confetti Dropping

Doings of the Automobile Club of America

AUTOMOBILE runs in this country are as yet a decided novelty, and previous to the New York-Philadelphia event of June 2 American automobilists in a body have never attempted anything of a pretentious nature. Short voyages scarcely exceeding a score of miles have been the limit of the exponents of horseless vehicles, and the century run to the Quaker City will be remembered as the initiatory of middle distance automobilism by the Automobile Club of America.

In this run 18 club vehicles participated, the number comprising 7 steam, 7 gasoline and 4 electrically driven machines. All of the vehicles but one—a 6 horse-power gasoline omnibus, with 6 occupants—carrying 2 persons.

In accordance with the programme arranged by the Committee on Runs and Tours the start of the run was made at 7.30 A. M. from the Waldorf-Astoria Hotel.

The itinerary follows:

South on Fifth avenue, through Fourth street, Broadway, Bleecker and Mulberry streets, across Five Points and Paradise Park, through Park, Centre and Nassau, Broad, Beaver and Whitehall streets to the Staten Island Ferry Slip. From St. George the route led along the Amboy road to Tottenville and thence by ferry to Perth Amboy. From there it led to Metuchen, thence to New Brunswick, thence to Franklin Park, thence to Princeton, where luncheon was served. After that the road led through Trenton, Whitehorse, Bordentown, Columbus, Mount Holly, Camden, Moorestown, Merchantsville and by ferry to Philadelphia. Arriving in Philadelphia the participants proceeded to the Hotel Bellevue, where dinner was served.

Though an early hour, the start from New York was witnessed by several hundred spectators, who displayed a lively interest in the novel spectacle.

Ten minutes before the start Astor Court, the place of rendezvous, was almost deserted, but all at once a dozen automobiles wheeled in, and for a few minutes the court resembled in a degree a railroad station in the swift manœuvring of the machines. Every *chauffeur*, however, found his place in the procession, and almost before the spectators, who had been attracted, were aware the vehicles were in line and away.

By courtesy of the *Commercial Advertiser*, Saturday Pictorial Review.

Mr. E. E. Schwarzkopf's Gasoline Omnibus, 6 H. P., Carrying Six Passengers and Baggage

Doings of the Automobile Club of America

Leading the procession as pace-maker Mr. George F. Chamberlin, President of the Club, accompanied by Dr. E. C. Chamberlin, occupied a new and heavily constructed gasoline carriage of 9 horse-power.

In the line behind President Chamberlin were Mr. E. E. Schwarzkopf, accompanied, in a family bus drawn by a fore-carriage of 6 horse-power, by General Roy Stone, Messrs. William Hazleton, Winslow Busby and E. S. Hyatt; Mr. A. L. Riker with three vehicles, in the first of which he and Mr. Allen H. Whiting rode; in the second, Mr. H. M. Bylesby and Mr. Robert Graf, and in the third, Mr. H. M. McGee and Mr. John Millikin. Mr. Samuel T. Davis, Jr., had three vehicles entered; in one he and Mr. A. R. Shattuck; in another, his guests, Mr. A. W. Robinson and Captain Malcolm Rafferty, and in the third three press representatives.

Mr. George Isham Scott, with General George Moore Smith; Mr. H. R. Maxwell had as guests Mr. V. Everitt Macy, Mr. Albert Otto and two other gentlemen. Others in the procession were Messrs. Langdon, Barber, Homer W. Hedge, S. M. Butler, F. A. La Roche and C. H. Metz.

The run down Fifth avenue, West Broadway, Bleecker street and other thoroughfares to South Ferry, where the ferry was taken for Staten Island, was full of exciting incidents, pedestrians standing by and gazing in open-eyed wonder at the carriages as they sped through the streets. Seven of the first contingent arrived in time to embark on the 8 o'clock boat. The remainder reached South Ferry in time to get aboard the 8.20 o'clock boat.

St. George, Staten Island, was made at 8.30 by the first seven. On the way over the automobilists got everything in readiness for a rapid run through Staten Island to Tottenville, fourteen miles from St. George. The route lay along the Amboy road, but a number of the automobilists were a little bit mixed as to which was the Amboy road at certain places and went astray. Mr. Metz was one of these. After a ride through a sandy stretch he reached Tottenville.

Mr. Metz was first to arrive at Tottenville and Mr. Davis second, although but little space, as automobiling goes, separated them. The little town on the southwestern end of Staten Island was reached at 9.29. A wait of twenty-five minutes for the ferry boat allowed ten of the other automobiles to come up, and when the boat drew out for Perth Amboy it had fourteen horseless carriages aboard.

Ten minutes were occupied in crossing to Perth Amboy, and

leaving the boat the vehicles shot off on the run to New Brunswick.

From New Brunswick to Princeton the route was through Franklin Park and Kingston. This section of the road proved to be both hilly and rocky for two-thirds of the way.

The electrics suffered slight accidents, but the remainder reached Princeton in good condition. Messrs. Post and Gilmore registered at 11.58; Acting President Chamberlin and Dr. E. C. Chamberlin at 12.08; Mr. Barber and Captain

By courtesy of the *Commercial Advertiser*, Saturday Pictorial Review.

Acting President George F. Chamberlin and Dr. E. C. Chamberlin, 9 H. P. Gasoline Phaeton

Hedge at 12.37; Messrs. Riker and Whitney at 1.11; Messrs. Hall and Fletcher at 1.18; Mr. Scott and General Smith at 1.25; Messrs. Davis and Shattuck at 2.02; Mr. Schwarzkopf and party at 2.15, and the others from then on until 3.30.

Luncheon was served at the Princeton Inn. After luncheon every *chauffeur* subjected his machine to a thorough overhauling, refilling gasoline reservoirs and water tanks, charging batteries and otherwise preparing for the final run of fifty miles. The first sixty miles having been accomplished with so little difficulty,

every participant in the run was ambitious to make the second and last stretch equally successful.

A few minutes after the procession of carriages drew out of Princeton at 3.30 o'clock a thunder-storm broke, and the run from that point to Camden developed a struggle subjecting to the severest test the abilities of the various vehicles irrespective of their weight, class, or motive power.

The rain occasioned much discomfort, but the *chauffeurs,*

By courtesy of the *Commercial Advertiser*, Saturday Pictorial Review.

Mr. George Isham Scott and General George Moore Smith, 3½ H. P. Steam Buggy

with their persons and vehicles plastered with mud, plowed on in the darkness through Trenton, Bordentown and Mount Holly.

President George W. Chamberlin was the first to reach Camden, where he embarked for Philadelphia. Arriving, he was escorted by a delegation of members of the Automobile Club of Philadelphia to the Hotel Bellevue, arriving at the hotel at 7.20 P. M.

As the vehicle drew up in front of the entrance of the hotel a forward wheel came off and the axle lurched to the pavement.

Examination showed that the ball-bearings and the cap of the outside of the hub had vanished, but all held together, somehow, long enough for Mr. Chamberlin to finish the journey of 110 miles of rocking travel from New York.

Mr. C. H. Metz, mounted on a gasoline tricycle, was the next member to arrive, coming to a stop at 7.40 P. M. From that hour until 2 A. M. the *chauffeurs* registered in turn.

Following is a list relative to the run, with names of principal participants and guests, and motive power of their respective vehicles:

Gasoline—Mr. George F. Chamberlin and Dr. E. C. Chamberlin; Mr. Percy Owens and Mr. O. S. McFarland; Mr. L. R. Adams and Mr. F. H. Gans; Mr. W. Everitt Macy and party in brake; Mr. F. A. La Roche; Mr. E. E. Schwarzkopf, General Roy Stone and Messrs. E. S. Hyatt, Winslow Busby and William Hazleton, in omnibuses; Mr. Charles H. Metz on tricycle.

Steam—Mr. S. T. Davis, Jr., and Mr. A. R. Shattuck; Mr. W. H. Hall and Mr. H. M. Fletcher; Mr. L. D. Langdon Barber and Captain Homer W. Hedge; Mr. George Isham Scott and General George Moore Smith; Mr. Arthur W. Robinson and Mr. Charles C. Moore; Mr. H. W. Curtis, Captain M. A. Rafferty and Mr. John C. Wetmore; Mr. J. C. McCoy.

Electric—Mr. A. L. Riker and Mr. Henry Byllesby; Mr. H. L. McGee and Mr. Edward Adams; Mr. John Millikin and Mr. Robert J. Graf; H. R. Maxim.

The return to New York was leisurely, Mr. George Isham Scott, with his guest, General George Moore Smith, being the first to arrive.

Lessons from the Automobile Club Run to Philadelphia.

The run, organized by the Automobile Club of America, from New York to Philadelphia on a specially selected road, has proved in all a great success. It has clearly demonstrated that for a long distance road travel the electric should decidedly be discarded, only the steam and gasoline motive powers be adopted.

The electric automobile, superior in many instances for city work, proved, in our estimation, an absolute failure on long distances. The gasoline and steam automobiles made this run at an expense averaging from about $1 to $1.50, covering 110 miles, while out of the four electrics only two arrived at the destination, and it is impossible to estimate at what price the two electrics came to Philadelphia.

Outside of the five changes of batteries it cannot be ascertained how much damage was caused to these batteries, and if

they were not even entirely destroyed. These batteries are extremely expensive and cost at an average of about $400.

Mr. A. L. Riker's electrical racer, with which he won the 50 mile race on Long Island, came to grief at the very beginning, and had to give up the struggle before arriving at Trenton. This racing machine seems to have been built for 50 mile distances.

Great credit is to be given to the Committee on Runs and Tours for selecting this road, subjecting thereby the vehicles to all road conditions—level roads, hilly roads, some stretches of dirt roads, macadam roads, one stretch of nearly 15 miles of sand and one stretch of about 9 miles of cobble-stones. The selection of the road was criticised by some daily papers having no knowledge of the Committee's purpose.

On the difficult roads, heavy rain set in about 4 o'clock, at the time when the vehicles left Princeton, and continuing until after the last arrival in Philadelphia. Notwithstanding the inclement weather, the sporting qualities of the club members have asserted themselves in the most brilliant manner. They attended to their own carriages and have clearly demonstrated that the "automobile," the last mode of terrestrial locomotion, has come to stay.

One heavy-weight vehicle, a gasoline bus, participated in this club run, carrying six passengers and about 440 pounds of baggage, and landed the whole party in Philadelphia at the expense of 9 gallons of gasoline, at 15 cents per gallon, or $1.35.

The club contemplates taking the same run again, and the members feel confident that the course will be covered next fall within six or seven hours.

Many of the club's members are still in Paris.

Mr. John Brisben Walker, one of the members of the club, recently announced that the House at Kingsland Point-on-Hudson has been refitted and will be in shape to entertain such members of the club as may find it a convenient stopping place. In addition to Mr. Walker's invitation is another issued by the New York Athletic Club, extending to the members of the Automobile Club of America the privileges of their house and grounds at Travers Island for the season of 1900.

The following gentlemen have been recently elected Active and Associate Members of the Club:

Active Members.—R. L. Morgan, A. B. Mohler, Harlan W. Whipple, W. L. Stow, Benjamin Stern, R. Esterbrook, W. McMaster Mills, Julius G. Kugelman, Paulding Farnham, James C.

Church, Frank W. Duryea, Charles Livingston Hyde, Ralph Brandreth, H. M. Byllesby, Percy Owen.

Associate Members.—Rollin Henry White, Frederick Mead Shepard, D. N. Seely, F. G. P. Barnes.

Insignia of the Automobile Club of America

Copyrighted, 1900, by Theodore B. Starr, New York

The Board of Governors have selected and adopted the accompanying design for a badge, which represents an automobile wheel with a ribbon intertwined in the spokes bearing the name of the club. The badge is of the size of a silver half dollar, and is manufactured either of gold with the tire of the wheel of silver, or of gold with the tire of wheel of gold, or of gold with the tire of the wheel of platinum. The badges are made by Theodore B. Starr, No. 206 Fifth avenue, New York City.

THE HORSELESS STABLE

THE automobile "stable" is a logical product of the times. While many devotees of the new sport continue to shelter their automobiles under the same roof with the quadrupeds of their former equipment, the real enthusiasts have procured separate quarters in which to store their more modern vehicles.

The Automobile Storage and Repair Company, of No. 57 West Sixty-sixth street, New York City, has made the first notable provision for the reception of automobiles in the metropolis, and the company has distinguished its purpose by the adoption of the appellation, "The Horseless Stable." The company occupies 4,000 feet of floor surface and the 50 or more vehicles at present being housed form an interesting exhibit.

An array of chamois-skins and dusters and a huge stand on which the vehicles are washed furnish the only suggestion of horse-stables.

The bright and correctly appointed carriages lend to the place the appearance of a show-room, the rheostats and electric meters on the wall have the effect of an electrical laboratory, and the office and waiting-rooms suggest a club. Altogether it is a most unique institution.

The International-Cup Race

THE race for the International Cup, instituted by the initiative of Mr. James Gordon Bennett, has passed into history, and, as was universally expected, has been won by the Automobile Club of France in the person of its representative, M. Ferdinand Charron, who has thus added new laurels to his brilliant record. A race which, as *Le Velo* has set forth, beats the express-train speed between Paris and Lyons, was naturally a tremendously exciting affair. Yet in some ways it was a disappointment, for as an international event it represented only three countries—the United States, Belgium and France. Germany was on hand, but on account of an unfortunate occurrence her representative withdrew just before the start. The three other important automobile countries, as they might be called—Great Britain, Austria and Italy, whose participation had been counted upon, were not represented at all. France, with her three contestants against one from the United States and one from Belgium, won a decisive victory and made a magnificent record.

Monsieur Ferdinand Charron,
The First Chauffeur of France

The start was from Ville l'Array, at the point selected at the entrance to Saint Cloud on the Versailles road, just above the Montretout grade crossing. It was nine hours and nine minutes later when M. Charron reached his goal at the restaurant des Delices de la Demi Lune, ten miles out of Lyons, covering the 566 kilometres, or about 351 miles, at an average gait of 61.857 kilometres, or 38.4 miles, an hour.

In order to make the route cover the 550 kilometres required by the stipulated conditions, it had to be made much longer than the direct route between Paris and Lyons. By rail the distance is 512 kilometres, or about 318 miles, and the express makes it in

eight hours and fifty-seven minutes; at M. Charron's average the train time would be eight hours and sixteen minutes.

The hazardous character of automobile-racing is shown by the fact that every competitor met with accidents, mostly due, it would appear, to the terrific strain and the intensity of wear and tear to which the vehicle and its mechanism are subjected under such a test. It seems a wonder, almost, that even two of the five contestants should have been able to run the race from start to finish.

The following were the contestants who entered and started:

M. René de Knyff, France.

M. Jenatzy, Belgium.

Mr. Alexander Winton, United States.

M. Ferdinand Charron, France.

M. Girardot, France.

Unfortunately Herr Engen, who was on hand to represent Germany, did not have his tires ready at the time given for the start, and accordingly withdrew with a protest against the short time allowed for getting ready; a protest which was supported by the Belgian contestant, M. Jenatzy, whose vehicle, that had been specially built for the occasion, was not ready, so that he used an improved racer, which was objected to somewhat because its tires were of French make.

A non-entered contestant, as he might be called, was M. Levegh, who had distinguished himself in winning the Bordeaux-Perigeux-Bordeaux race against Mr. Bostwick. Had Mr. Levegh been regularly competing, possibly he might have given Charron a hard struggle. He started ahead of the regular contestants. He was seen to pass Limours at the rate of 100 kilometres, or 62 miles, an hour; at Chateaudun he had made the 125 kilometres, or 77.6 miles, in one hour and thirty-two minutes, and he passed Orleans at 5.25 o'clock.

At Chateaudun the first accident was noted, Mr. Winton, the victim, passing with a bent front wheel and punctured rear tire. At Orleans M. Charron appeared with an axle bent in taking a gutter 3 kilometres before, and at the same place M. René de Knyff practically withdrew on account of breaking his fourth speed just after passing Chartres, but did not formally abandon it until reaching Gien at 11.25. At Orleans he was followed in three minutes by M. Jenatzy with two fuses broken and several punctures. Then, just on leaving the city, M. Girardot lost his fine advantage by his ill-luck in frightening a horse and running against a curb to avoid a collision. This broke his wheel and he lost over an hour in waiting for repairs at a neighboring

blacksmith shop, not being able to resume until 7.55 o'clock. At Chervreuse M. Jenatzy was disabled by bursting both front tires. The last accident was to M. Charron, 12 kilometres before the finish, his pump broken by running over a dog.

M. Charron reached the goal much exhausted, but pleased with his victory. He was greeted by a large number of automobilists who had come out to await the end. In the evening MM. Charron and Girardot were entertained by the Automobile and Bicycle Club of Lyons.

The chief lesson of the race appears to be the need of greater care in construction. Parts should be made much stronger, and tested thoroughly to stand strains far greater than what they are subjected to on such occasions. The margin of stability should be very much increased. And judging by the experiences here, it would appear that there is as much need for the racing automobilist to carry a fifth wheel to his coach as in the case of artillery.

Following is a recapitulation of the time of the contestants at the various points along the route:

Left Ville d'Array 3.14 *A. M.*

GIRARDOT.	CHARRON.	DE KNYFF.	WINTON.	JENATZY.
H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
	Limours, 18.6 *miles* (30 kilometers).			
35 15	38	39 30	45	1 15
	Chateaudun, 77.6 *miles* (125 kilometers).			
2 00 44	2 26 55		3 14 50	2 37 56
	Les Ormes, 95.6 *miles* (154 kilometers).			
2 35	2 41	3 27		3 32
	Orleans, *miles*.			
2 39	2 56	3 35	5 16	3 38
	Gien, 146.5 *miles* (236 kilometers).			
5 31	4 01			
	Nevers, 200 *miles* (322 kilometers).			
6 56	5 28			
	Moulins, 233½ *miles* (376 kilometers).			
	6 14			
	La Palisse, 265 *miles* (427 kilometers).			
7 50	6 55			
	Roane, 286½ *miles* (476 kilometers).			
8 27	7 49			
	Lyons, 351 *miles* (566 kilometers).			
10 30 28	9 9 48			

The Police Department on Traffic

IN consequence of the increasing frequency of accidents resulting from careless and oftentimes reckless management in vehicle street traffic in New York City, the Chief of Police has recently issued, for action by the Captains of the various precincts, an order, a copy of which follows:

POLICE DEPARTMENT OF THE CITY OF NEW YORK,
OFFICE OF CHIEF OF POLICE,
300 MULBERRY STREET,
NEW YORK, June 9, 1900.

SIR—You will give the members of your command special instruction regarding their duties in connection with the so-called "Rules of the Road," and especially with regard to the necessity for drivers of vehicles of all kinds being made to keep to the right on any thoroughfare on which they may be proceeding.

You will also instruct the members of your command that whenever any driver, motorman, brakeman or other person in charge of any car, truck, wagon, carriage or vehicle of any kind refuses to stop such vehicle promptly when an officer raises his hand as a signal that the vehicle is to be stopped, the driver or person in charge of such vehicle must be arrested. The failure of those in charge of vehicles to promptly obey the directions of police officers on crossings, at ferries, in crowded streets, squares, etc., is a dangerous practice, and one that I insist shall be checked. The interests of the officers themselves, as well as the life, safety and comfort of the general public, are dependent upon the strict observance of these regulations by persons in charge of the vehicles, and you will impress upon the members of your command the necessity of a rigid enforcement of said regulations.

Read this to your command at three successive platoon roll-calls immediately following its receipt.

(Signed) WILLIAM S. DEVERY,
Chief of Police.

The First American Automobile Show

THE Inter-State Fair which is held every year at Trenton, N. J., will have many new and interesting features this year.

The Fair will open September 24, and will include an exposition of automobiles and accessories and a series of automobile races. The automobile exposition will occupy 30,000 square feet in Building No. 3, which, in former years, has been devoted to exhibitions of carriages and miscellaneous exhibits. It will, undoubtedly, be one of the greatest exhibitions of horseless vehicles that have been seen in this country.

The exposition and races will be held under the direction of Mr. E. E. Schwarzkopf, a member of the Automobile Club of America.

It is announced by the management of the Fair Association that there will be no charge for spaces desired for exhibiting automobiles and their accessories, but all allotments of space must be secured on or before the 15th of July. The entries for races will close on September 1.

The opening day of the Fair will be devoted to the races, and the winner of the series will be presented with a handsome silver trophy to be known as the " Inter-State Fair Cup." The entrance fee for each vehicle will be $10.

Of the races there will be five events in all. The preliminary tests will be for $100 each, or a plate valued at that sum, and a ten-mile open championship race for a purse of $200.

Following is the list of the events in contemplation:

First race—Electric, 5 miles, $100 plate or cash.

Second race—Gasoline, 5 miles, $100 plate or cash.

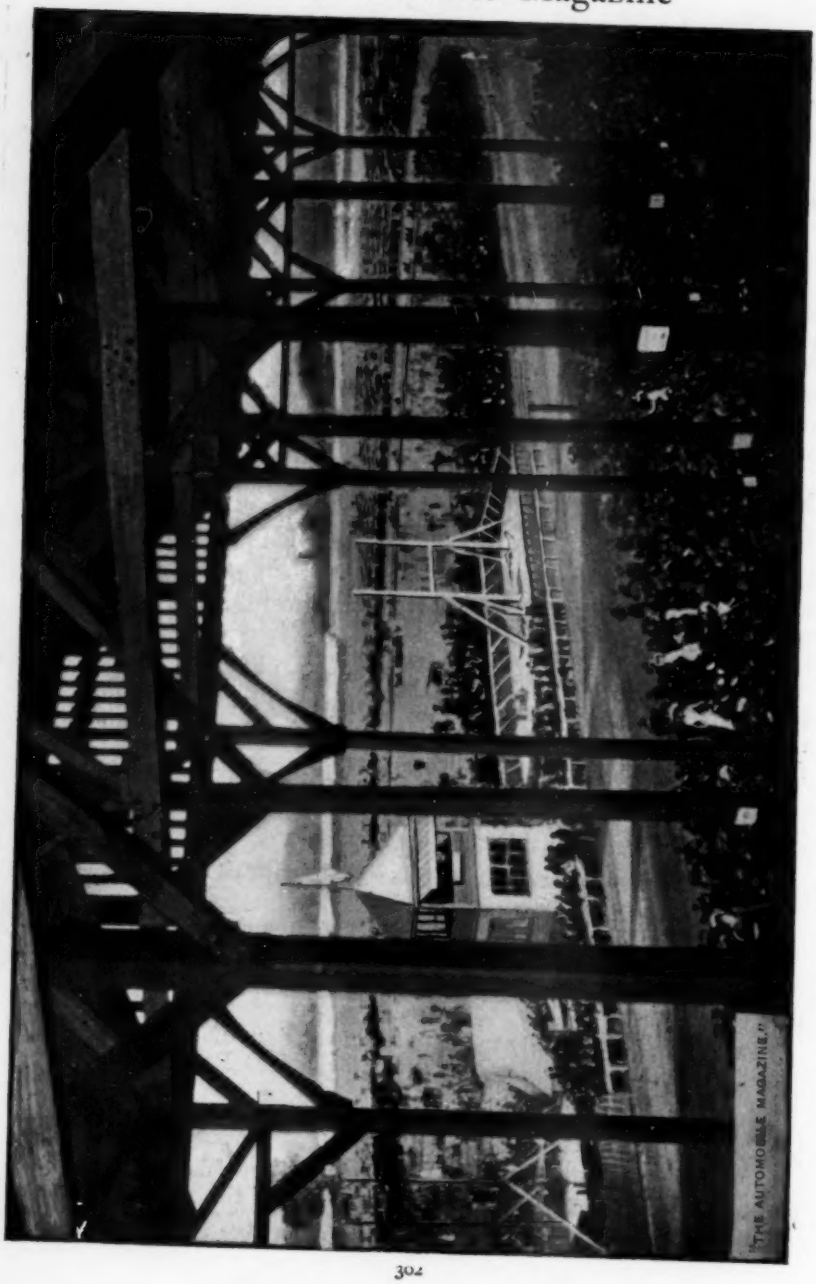
Third race—Steam, 5 miles, $100 plate or cash.

Fourth race—Open championship, 10 miles, $200 plate or cash.

Fifth race—Open only to members of the Automobile Club of America and Automobile Club of Philadelphia, Pa., 10 miles, Inter-State Fair Cup.

The Fair Association will provide for the establishment of a charging station for electric vehicles.

The stewards of the meet and the judges of vehicles and their accessories will be constituted from members of the Automobile



One-half Mile Automobile Track (65 feet wide), Greater Inter-State Fair (Trenton, N. J.)

The First American Automobile Show

Club of America and the Automobile Club of Philadelphia, who will sign and present handsome diplomas to successful competitors. There is to be no race with less than three competitors, and all of the races are to be governed by the racing rules of the Automobile Club of America.

The Inter-State Fair Association of Trenton, N. J., is organized under the General Corporation Law of the State of New Jersey.

The official organization consists of a President and Vice-President, elected annually by the stockholders, and a Board of twenty-seven Directors, also elected by the stockholders for a term of three years each, nine members of the Board retiring each year. The Treasurer and Secretary are elected by the Board of Directors.

Mahlon R. Margerum, Secretary Greater Inter-State Fair (Trenton, N. J.)

The real estate of the Association consists of 120 acres of land, situated in the township of Hamilton, Mercer County, N. J., adjoining the City of Trenton. The Fair Grounds are located directly on the main line of the New York division of the Pennsylvania Railroad.

Ninety acres of the tract referred to are enclosed in the Fair Grounds proper and used for exhibition purposes. The buildings and improvements consist of an oval half-mile clay track 66 feet wide. A single-deck grandstand, 427 feet long and 60 feet deep, the seating capacity of which is 5,179, comprising 168 box seats, 1,670 folding reserved chairs and 3,341 high-backed bench seats. In addition there are provided 1,516 seats on open bleachers within the grandstand paddock.

The attendance in past years has been from 50,000 to 60,000 people daily.

There are the following exhibition buildings:

Art and ladies' work and home and dairy products	80 × 160 feet.
Merchants and trades' display.....	80 × 160 "

Poultry, pigeons and pets..... 72 × 100 "
Agricultural and horticultural products..... 200 × 200 feet.

The stabling for the live stock department is divided as follows:

140 stalls for speed horses..... 10 × 12 feet.
160 " " horses for general use..... 10 × 15 "
252 " " cattle and horned stock..... 10 × 12 "
206 " " sheep and swine..... 7 × 10 "

The exhibits will consist of 12 departments, classified as follows:

Department A.—Horses for speed.
Department B.—Horses for general use.
Department C.—Cattle.
Department D.—Sheep and Swine.
Department E.—Poultry, Pigeons and Pets.
Department F.—Merchants and Trades' Display.
Department G.—Art and Ladies' Fancy Work.
Department H.—Home and Dairy Products.
Department I.—Agricultural and Horticultural Products.
Department J.—Farm Machinery and Implements.
Department K.—Carriages and Vehicles.
Department L.—Automobiles and Accessories.

The Fair will be open from September 24 to September 28, inclusive.

The officers of the Association are: General Richard A. Donnelly, Rudolph V. Kuser, and Mahlon R. Margerum—President, Treasurer and Secretary, respectively.

Why the Automobile Tipped Over

By Richard Leonard Bell

PLEASE can I have the automobile for the early train?"

In the almost breathless request, the hurried, fierce, and almost defiant manner, it would have been difficult for any one to have recognized the speaker. She was a girl. A young, bright, pretty girl, who, radiant in her shining ball-dress, and with the happiest face and lightest tread, in the room, had been dancing indefatigably for the past four hours. No one had seemed to enter with more joyous abandonment into the spirit of the hour, and accordingly the petulant demand, with its accompaniment of flushed cheek and quivering lips, almost took away the breath of the person to whom it was addressed.

Mr. James Smithton, the millionaire manufacturer of bathtubs, was giving the ball—a summer ball at his summer home in the Adirondacks—for the purpose of pleasing his young cousin, Ethel Moore, and to celebrate a certain event which had his warm personal approval and sanction. The function was nearly over and it had been a great success. He was good-naturedly conscious of having given a great deal of pleasure, and was now leaning against the entrance doorway ready for the departing guests to pass through and shake his hand and offer him their congratulations. Accordingly his first reply to Miss Moore's breathless "Can I have an automobile for the early train?" was a stare of bewilderment.

"Great Heavens, Ethel! What do you mean? What have you to do with the early train?"

"Only that I am going away by it, Mr. Smithton."

"Going away by it! My dear girl! I really don't understand. Dear me, what will Tom Willing say to that?"

"Thomas Willing will have nothing to say to it. Mr. Willing has no right to say anything now. But please don't ask me any questions. I will write everything after I have gone. Only can I have an automobile?"

"Of course, my dear child, you can have an automobile. But," in tones of remonstrance, "it's nearly 3 o'clock now and to catch the early train for New York you must start by seven."

"I know—I know. I will be ready. Oh! thank you so

much, Mr. Smithton—but—but I can't stay." Then there was a sudden sob; and the next moment there was a rustle of flying skirts, and a white figure vanished up the broad staircase and was instantly lost to view.

"Wow," exclaimed Mr. Smithton, looking after her, "that's quick work; what the—but another voice at his elbow interrupted.

"So sorry to trouble you, Mr. Smithton, but can I have an automobile to be carted over to Grandview to catch the early train? It's a nuisance, but I find I've got to leave at once. I know you will forgive me for cutting short my visit, which, believe me, I regret to do. I will explain by letter. It's rather sudden, and I'm really ashamed to have to worry you with so early a start—but I must."

This speaker was a tall young man, whose serious face added to the dignity and composure with which he made his request. But a close observer would have seen that Tom Willing was, in a manner, not himself. The host, after a glance and an imperceptible raising of the eyebrows, did not attempt to argue the point, as he had done in Miss Moore's case.

"Of course, Tom, my boy, you can have anything you want," he replied. "You know it will be necessary for you to rise before you have had more than a few hours' sleep, for the train passes Grandview at a little past eight, but I will bring out the speediest of my machines to get you there in time. I'm sorry you're going, Tom, but if it is a case of 'must' the only thing to be done is to give orders at once. I will have your breakfast sent to your room, and you be at the front door at seven sharp. I'll see to it myself, and will call you in person, for the servants will be half asleep."

"I shall not go to bed," said Willing quietly, "it's not worth while; and besides I couldn't sleep if I did. I think, however, I'll go up and pack now, so 'good-night.'" He put out his hand and held that of the other for a moment. Their eyes met, but neither spoke another word.

"Now, what on earth can it be?" Mr. James Smithton cogitated with himself, as he went to give orders. "A capital match—a nice, bright, pretty girl, and a good girl, too—and with a fortune that would have been such a comfort to poor Tom, who has a mother and three sisters depending on his salary! And Tom is such a good fellow—such a good fellow, and so honestly in love. And he's a man who, I verily believe, was never in love in his life before. It seemed too good to be true. Indeed it did. And I gave this ball and have stayed up all night to let everybody

know of the engagement, and this is to be the end of it. Two automobiles ordered for the early train! That's a nice kind of an anti-climax."

A slow frown settled down on the millionaire's usually jovial countenance. For a moment he stood in a deep meditation.

"By heavens!" he suddenly said aloud, "there shall only be one automobile!"

Punctual to the moment the tall form of Tom Willing, fully equipped, stood on the front doorstep. He was looking at his watch and seemed to be nervous. The "zing" of the bell was all that told him that the smooth-running automobile was approaching the house. In another instant an open, high, two-seated vehicle stood in front of him. It was one of the many in the horseless stable of Mr. Smithton. Tom's valise and golf-case were placed on the front seat beside the driver, and Tom himself stepped sprightly to the rear seat, and waited for the driver to start.

The automobile did not move. One—two—three minutes. Tom was getting impatient. He looked at his watch nervously, but had he looked over his shoulder he would have seen another figure emerge from the hall door—a girlish figure in a gray traveling dress evidently put on in haste, for her coat collar was unfastened, her hat awry and her gloves in her hand. Moreover, the youthful traveler's face was very pale, and her eyes were very red. At sight of Tom Willing she stopped with a start. And something made Tom turn at that moment. As his eyes met hers he was motionless with consternation.

"My—my automobile; my maid. Where are they?" Miss Moore gasped as she looked blankly at the footman who had come to help her.

"Your maid went on with the baggage, Miss," replied the servant. "She thought it best, fearing that some of the parcels might get lost." The footman shivered in the cool morning air, respectfully signifying by his demeanor that he would consider it a favor if Miss Moore would hurry and let him return to bed and resume the sleep from which he had been so rudely awakened. The driver of the automobile, an intelligent American boy, in a natty livery of red and gray, grasped the motor lever and gave the bell a tiny ring just to impress the young lady that time was precious, and that if she really wanted to catch that early train she would have to mount the automobile and without a moment's delay. Was ever girl placed in such a predicament, she thought—or was ever man, thought Tom. To have to ride side by side over five miles of beautiful roadway, through scenes familiar and

attractive and in the bright sunshine of a perfect June morning, when only a few short hours before they had decided to part forever.

The footman assured Miss Moore that "no other conveyance had been ordered." Tom Willing noticed her discomfiture. It was for him to act. Under the eyes of the servants he could not put down his luggage and return to the house. So without uttering a word he jumped from the automobile and as Miss Moore walked toward it, seemingly in a trance, he gallantly helped her to the rear seat and then sat down beside her. A light robe was spread over their knees by the footman, and the driver, without waiting for a word, pulled the lever that sent the graceful machine over the garden road as if it were a thing of life.

Over the highways they rolled, their faces looking in opposite directions, and with no charm in their hearts for the singing birds, the gay colored flowers of the fields and the seemingly eternal chain of mountains stretching away before them—all of which they had once happily mingled in their love talk. Tom wondered if he had done right. Occasionally he would cast furtive glances at his luggage in the front seat and wondered how Ethel would rather have been there instead of beside him. But conventionality prevented a young lady from sitting beside the driver of an automobile or any other bygone vehicle, when there was another seat to be had. So with swelling heart and compressed lips one sat well forward hoping that her face was nowhere visible, and that the back of her neck and throat betrayed nothing. In a miserably distorted, screwed up and excruciatingly uncomfortable attitude, the other held himself well back, breathing fast and unevenly.

The automobile whirled faster and faster. Winston appeared to be a somewhat reckless driver. They swayed from side to side, and more than once narrowly escaped taking a post or the end of a bridge rail. Tom Willing would have called out sharply to the driver to be more careful, but Tom Willing was determined not to open his mouth.

He looked round uneasily, however, more than once, and knitted his brows under his white felt hat. "He'll have us over," he was saying to himself, and he had barely said this, without any thought of it being the actual truth, when there came a tremendous lurch, the automobile appeared to spring up in the air on one side, and the next moment its occupants—or at all events, two of them, were shot out and landed in some soft grass by the roadside, where both for a moment lay quite still.

Winston tugged madly at the lever and it seemed for the

moment as if the automobile had got beyond his control. The vehicle stopped and started—went backward and forward as if a devil had possessed it, and then giving a mighty spring shot over the roadway and Willing was on his feet just in time to see it bolt over the summit of a hill. Winston was on his feet, but still sticking to his post.

Tom Willing knelt by the side of his motionless companion.

"Ethel."

"Mr. Willing," she replied after a moment of tears.

"Oh, Ethel, my darling, you are not killed. Thank heaven for that. But are you hurt? Open your eyes and see who it is; it is I—Tom—tell me are you—are you hurt?"

"I—I don't think I am hurt, thank you, Mr.—Tom," faintly. "Oh—Tom—do tell me are you hurt? Oh, do say you are not h-h-hurt, Tom?"

"My poor Ethel," and Tom folded her in his arms.

Ethel sobbed vehemently. All she could say was "oh-oh-oh-oh! To-To-To-Tom."

Tom, in her ear: "Won't you tell me what it was, dear?"

"Oh, I don't think I can, Tom."

Tom, however, was sure that she could. He was kneeling by her side on the damp grass, her head was on his shoulder and her face so close to his that no one could have told when they touched each other. Now, he was not going to trifle with the advantages of such a situation. "You must tell me," he firmly said, and he reiterated this so often and accompanied the demand with so much pressure of another sort, that at last—well, at last she did tell him.

She had overheard such a dreadful thing at the ball—such a dreadful, dreadful thing. She had heard some one, but she did not know who, but the voice was quite clear, so that she could not help hearing; though indeed, indeed she did not mean to listen—but she had heard the voice say, "Isn't it luck for Tom Willing to get a girl with all that money?" Then another voice had replied that it certainly was luck, but that Tom was a good fellow.

"He said you were a good fellow," sobbed poor Ethel; "he did say that, Tom; but still he spoke, and the other fellow spoke, as if they thought, and as if everyone would think, you cared for—for my money. Oh, oh, oh! At least as if it would be a great thing for you, and, oh! Tom, I did—did think you loved me."

Tom was silent. He was hurt in his tenderest point. A poor man, but honest as the day; the congratulations of his friends, through some of which he had himself perceived a covert

meaning which none dared put in open words, had already made him wince. But conscious of integrity, he had proudly thought that time would give the lie to all such base insinuations, and with perfect trust in his betrothed, it had never occurred to him that she could either have felt any doubts on her own account or hearkened to the idle words of others. She had given him no explanation of the passionate withdrawal of her affection a few hours before.

Looking up she now beheld the deep emotion painted on his face, and cried aloud in her agony of shame: "Oh, what have I done? What have I done? Oh, Tom, I did not mean it; how could I do it. Oh, Tom, will you ever, ever forgive me. And will you—won't you marry me? Oh, please do, Tom; my Tom!"

At last the tall figure rose from his kneeling posture, drawing up with him the small and bedraggled form which he could scarcely even then consent to loose from his hold; and at last he smiled as he looked at her and at himself. "I really think we are too wet, too dirty and altogether too disreputable a pair to appear at the depot," said he, taking out his handkerchief to wipe a long dark smear from her cheek. "I really think, too, Ethel, that we never could catch that early train, even if we tried." At this moment the automobile, with Winston securely seated in his place, appeared above the brow of the hill; Winston peering about anxiously for the whereabouts of his fellow-sufferers.

"Here we are," cried Tom, rather unnecessarily; then turning again to the girl, whose bare hand lay fast in his own, he murmured as the automobile wheeled up, "We'll go back to Mr. Smithton's, Ethel, and say we had an accident, and I'll make it all right with Smithton. No one else need know anything about this, and we will not cut our visit short, after all, shall we?"

The shutters were still down all over the spacious mansion of Mr. James Smithton, and all appeared precisely as the travelers had left it an hour and a half before, when the little party returned to tell the tale of its mishap; only Mr. Smithton, who was an early riser, had come down and was on the lowest step of the stairs looking abroad to see what kind of a day it was going to be.

Ethel flew past him—she was "not fit to be looked at." Tom lingered a moment to give explanations and to add that more would be forthcoming presently. He had changed his plans, he——"All right," Mr. Smithton cut the speaker short heartily. "Glad to hear it; delighted to hear it. Get up to your room and change your clothes for breakfast. No one need know anything about this escapade; you come down to breakfast as if nothing

had happened, and we'll talk it over privately presently. I can see it's all right. Eh?" smiling significantly.

Tom nodded, smiling in answer.

"Good luck! I am glad. But hurry, Tom," as the young man went inside—"and Winston, I want to see you, Winston," continued the millionaire as he went up to the automobile driver, who sat imperturbable in his seat. "Well, Winston! Well! How was it? How did you do it?"

"Oh, we did very well, sir," returned Winston with an unbridled smile. "I just drove her from side to side till we came to a little hill on the side of the road, and I ran her up against the hill and tipped them over where you said, sir, and then I just made the auto bolt over the hill and stayed around the corner till it was time to come back, as you said, sir. And the automobile behaved just fine, sir. It seemed to know just what it had to do; and when I started back I found them in the roadway wet and dirty, too late to catch the train, and willing to come back—just as you said they would be, sir."

"Well done," answered Mr. Smithton, as he slipped a ten-dollar note in his driver's hand. "But don't you ever say a word about it."

For Good Roads

A Request by the League of American Wheelmen

THE Highway Improvement Committee has been working since its selection with delegates to the various National conventions for the insertion of a Good Roads plank that shall be not merely a jumble of words meaning nothing, but a pledge to appropriate money on a liberal scale sufficient to enable the Roads Inquiry Department of the Department of Agriculture to carry out the work for which it was formed.

Jericho Pike, Queens, Long Island

This Department, it may not be generally known, was established as a result of hard work done at Washington by the League of American Wheelmen. The appropriation by Congress of $25,000 a year is absurd, and has made impossible anything like the work planned.

General Stone and Professor Harrison have done all in their power with their very limited means, but progress has been made so slowly that the United States is still behind every other civilized country on the road question. In every other line indicat-

ing higher civilization it surpasses every other country in the world. While billions have been appropriated under the name of "River and Harbor Improvements," and in many cases vast sums spent for deepening and widening channels of streams used by few, if any, boats, and of interest only to some small village or town, the highways have received absolutely no attention and no appropriation from the national government. A bill introduced by the L. A. W. asking Congress to appropriate $5,000,000 has received but little attention, while days have been spent in looking up and passing upon private claims and matters effecting in no way the advancement of our great country. The belief

Cove Road, Oyster Bay, Long Island

that the farmer is a foe to Good Roads and apathetic, if not absolutely antagonistic, to any legislation on this line may have been true years ago. That day has passed and the politician who to-day makes such statements either proves that he is grossly ignorant or else is making willful misrepresentations for his own selfish purposes. Every Good Roads worker knows that to-day the farmer is his best friend, and that with his aid the Good Roads laws which have enabled Massachusetts and New Jersey to advance far ahead of all other States, were passed by the votes of the rural districts, and to-day the strongest backer and Good Roads apostle is the farmer. State aid and national aid is an

absolute necessity. The agriculturists of the country cannot be called upon to pay all the expenses of a road simply because it goes by his front gate and may run along his land for a great distance. The roads in the rural districts should be paid for by the community in general just as city improvements are paid for *pro rata* by all the inhabitants. The farmer knows very well that the cost of hauling his produce direct to the consuming cities or to his nearest railroad station is a very great proportion of the expense. The agriculturalists, further, know that whereas in European country the rate per ton per mile is 8 cents or below, while in this country it runs up to 25 cents and even higher, and

Avenue of Locusts, Oyster Bay, Long Island

that not only is an absolutely unnecessary expense added to his production cost, but in certain seasons of the year he is unable to market his crops at all on account of the condition of the roads. It has been proven conclusively, and statistics are not wanting on the subject to show, that State aid laws immediately become popular after effect is seen, and that greater appropriations with the consequent taxation on every individual in the State has been asked from year to year by the farmers in every section of the State, especially in the rural districts, and that, in fact, the amount of work asked for in all the States working under State law is far in excess of the appropriation, in many cases years ahead of

the money available or in sight. A Good Roads plank in the platform of any party, either in State or national election, bringing great strength to the ticket nominated by that party, and it is no longer to be said that this particular subject is of interest only to the wheelmen. The wheelmen have answered the question for themselves, and by a trifling tax they are building in all sections of the country cycle paths particularly suitable for the wheel, and at a cost not to exceed $100 per mile perfect wheelways can be built. These side paths can be made with great rapidity and maintained at little cost. The cry of class legislation no longer holds. The Good Roads advocate, whether he be

Head of Little Neck Bay, Manhassett, Long Island

a pedestrian, cyclist, horseman or automobilist, is no longer looked on askance. His honesty of purpose can not be questioned. Loyal support is given him, and to-day the agricultural societies, automobile clubs, Good Roads associations, village improvement societies, are all working hand in hand with the League of American Wheelmen for highway improvements in every section of the United States, and if progressive citizens and every well wisher of this country would write to the delegates from his section to the national convention, a plank would be put into their party platform which would not be second in strength to that of any other used. Let us " get together " and write at

Easthampton, Long Island

once. Set your delegates thinking before they go to the convention cities, and when it is found that the sentiment from your section of the country is for some strong movement to forward the improvement of highways the formers of the party platform will find ample room—and that near the top—for a strong Good Roads plank.

Yours truly,

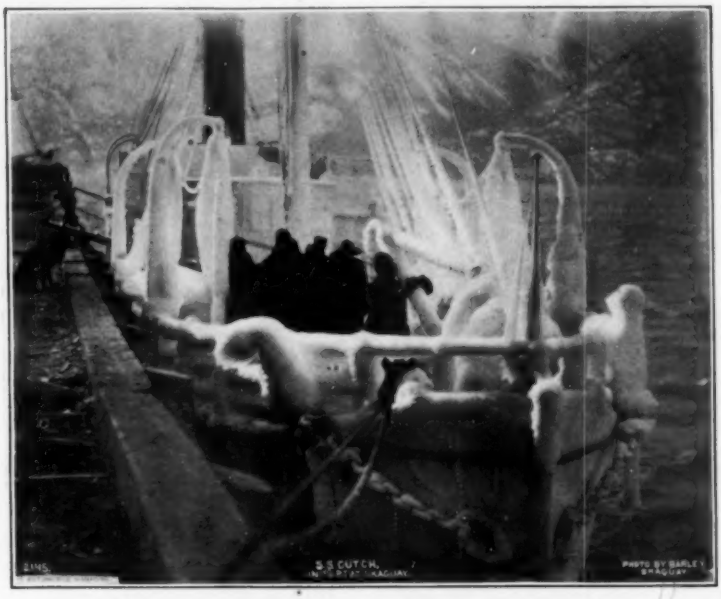
H. B. FULLERTON,
Chairman Highway Improvement Committee, L. A. W.

AUTOMOBILE PARADE

An automobile parade is being organized to take place in Bridgeport, Conn., July 4, under the auspices of the *Evening Post and Morning Telegram* of that city. Prominent citizens will act as judges and Mr. T. E. Griffen, a pioneer *chauffeur,* will offer a trophy for the best decorated automobile. A series of motorcycle races also have been arranged for at Pleasure Beach after the parade.

The Automobile in Alaska

WHEN the little coasting steamer "Cutch" left Vancouver on one of her regular voyages to Skaguay last March, her manifest bore an item which had never appeared there before. It was "one automobile," of which Monsieur E. Janne de Lamare was consignor and consignee. After the ship's arrival at Skaguay the cargo was transferred to the freight-cars of the new Yukon and White Pass Railroad, and



S. S. Cutch Carrying the First Automobile to Alaska

a few days later the first automobile in Alaska rolled out upon the ice-crusted lake at Bennett. The machine carried two persons, one being Mr. de Lamare, who owns one-third of the town site of Atlin, B. C., the other his friend-*chauffeur*, Mr. Raphael Merville, a young French record-making motor-cyclist of last year. Mr. de Lamare and his friend returned to Alaska from the United States after developing a long cherished plan for the em-

ployment of an automobile as the method of rapid transit to the Klondike.

As he had traversed three times previously the 640 miles which separate Bennett from Dawson City, Mr. de Lamare entertained no illusions in undertaking the journey in an automobile. In point of fact, after a review of the situation, embracing the low and limited construction of their vehicle and the arrival of an unusually early northern season, both adventurers entertained considerable doubt as to the complete success of their expedition. The arctic automobilists arrived in Bennett the last part of March, and though the thaw in former years did not begin until

At the Great White Pass, One Way of Reaching the Klondike

the middle of May, they learned that many of the streams further north were beginning to break. This was unwelcome news, as the Fifty Mile river, which lay in that direction, had been chosen as the best automobile course northward after leaving Lake Tagish.

The itinerary from Bennett follows: North on Lake Bennett to Cariboo Crossing, situated at the end of Lake Bennett, to Windy Arm, to Naies Lake; thence to Tagish Lake; thence to Tagish, at which point the Fifty Mile river enters Lake Tagish, northward on the Fifty Mile river to Miles Canon Pass, to White Horse Rapids, which never freeze.

The route continues to Lake Lebarge, to Lewes river, by which Fort Selkirk, the future official capital of the Yukon Territory, is reached. From Fort Selkirk the course is over the Yukon river, by which the voyagers intended to descend to Dawson City.

The machine employed in the experiment was a tricycle voiturette of the Bolleé type of 3¾ horse-power. The vehicle, which may answer all requirements on a good road and in a milder climate, failed to realize all that was expected of it in the Alaskan journey.

As mentioned above, the carriage was low in construction,

Winter Scene. Another Way of Reaching the Klondike

the foot-board of the trailer and the motor, which was attached to the rear wheel, being within a few inches of the traction-base.

After a few days in Bennett the *chauffeurs* left the little mushroom city followed by the shouts and the "good lucks" of the townspeople, who turned out *en masse* to watch the start of the carriage. Learning of the open condition of the streams in the upper country, Mr. de Lamare found it necessary to change his original plans.

It was at first intended that the commissariat and supply of fuel should be drawn on a sled attached to the rear of the machine. With a view to the probable speed of the vehicle and

the unusually bad condition of the route, this plan was abandoned as impracticable. It was then proposed to proceed without the supply of provisions and depend on a possible meeting with prospectors or Indians, but that plan also was put aside, as the store of gasoline was not to be ignored. As there was not an inch of unused space on the carriage the *chauffeurs* were compelled to engage a native with sled and dogs to follow with the provisions and fuel as best he might.

For the first few miles the lake-trail was good, and it was not until the vehicle had covered 15 miles did the suggestion of sub-

The Modern Way of Reaching the Klondike

sequent difficulty present itself. At this distance from Bennett the trouble of the *chauffeurs* began. Huge snow-drifts which freezing under a temperature of 52 degrees below zero at night became brittle on the crust under the sun's rays. In some places where the snow had been blown away, leaving the ice visible, water to the depth of two and sometimes three inches was encountered. But in spite of these obstacles the little machine maintained a speed of 15 miles an hour. The uneven trail made by the half-frozen drifts caused the vehicle to " kick " and " skate," performances holding forth no bright promise for the long survival of the motor. After many shocks and jars, each of which seeming to

be the last, the *chauffeurs* reduced the speed of the carriage one-half. The trail became worse and worse, and when the expedition had put 22 miles behind, the solder broke away from a portion of the gasoline conduit, which was swathed in strips of flannel to exclude the cold. A leak resulted, and the fluid running out on the fabric took fire. This necessitated a stop, and by the use of snow the flame was extinguished. As there was no solder at hand to repair the rupture, the repair was made by winding wire around the injured portion. This operation occupied two and a half hours, after which the outfit slowly and carefully proceeded to Cariboo Crossing, 28 miles from Bennett, arriving five hours

An Alaskan Caravansary

later. At Cariboo Crossing a blacksmith was found and the machine was repaired *a la* Klondike. At this point Mr. Merville, who, suffering from exposure resulting from the halt for repairs on the lake, fell ill, and the adventurers remained at Cariboo Crossing for the night. During the night the commissariat came up and Mr. Merville having recovered sufficiently to proceed the expedition set out on the following morning on the second stage of their journey. Though the running during the day cannot be described as "smooth," the trail was not as slushy as that of the previous day. Passing Windy Arm, which is a small peninsular a few miles north of Cariboo Crossing, the

chauffeurs drove out across Naies Lake, which, at its northern extremity, joins Taku Lake in the east and Lake Tagish in the west. Few of the motor-wrenching hillocks of the day before were encountered on Naies Lake, and for the greater part of the way its surface was as smooth as glass. Due to a lowering of the temperature the pneumatic tires remained dry, and the adjustment to the fore-wheels of a novel set of runners, included in the outfit, was found to be unnecessary. ,

Though Mr. de Lamare was in possession of knowledge concerning the probable condition of the Fifty Mile river, he hoped

Atlin, B. C., from the Lake

to reach it before a thaw, making auto-navigation impossible, began in earnest. Therefore on reaching Tagish, after a rough and eventful journey across Lake Tagish, the voyagers were downcast on finding the river, which enters the lake at that point, open. This circumstance having defeated their purpose to reach Dawson, the intrepid *chauffeurs* determined to subject the machine to a further test by essaying a journey to Atlin, 83 miles from Tagish. Leaving Tagish the duo turned eastward, returning by the old trail to Naies Lake. Crossing Naies Lake they entered Taku Lake. The trail improved as they proceeded, and

during the night the machine at some points maintained a speed of 40 miles an hour by moonlight.

Golden Gate, a small place situated on the west side of a peninsular separating Taku Lake from Atlin Lake, was the first objective point of the adventurers.

Fifty miles had been covered, and at a time when the journey promised to be speedily accomplished the cap of the motor's carbureter became dislodged and was lost on the trail.

Without provisions and unable to proceed with the vehicle, the *chauffeurs* waited thirty-six hours for the commissariat to

Arrival of Messrs. De Lamare and Merville in the First Automobile at Atlin, B. C., April 14th, 1900

come up. After its arrival temporary repairs were made and they proceeded at a reduced speed to Golden Gate. From Golden Gate the trail on Atlin Lake was good, and on the 4th of April the automobile arrived in Atlin.

In Atlin the machine was overhauled, and a few days later the *chauffeurs* started on the return trip to Bennett, where they arrived after a passage no less eventful than the trip out.

The expedition was purely an experiment, and as such it cannot be said that it is without its good results.

Before his departure for Paris, Mr. de Lamare made the statement that next year, in an automobile of 6 to 8 horse-power, of

Typical Street Scene, Atlin, B. C.

American manufacture, he will experience no difficulty covering the 640 miles between Bennett and Dawson City in forty-eight hours.

BADEN-POWELL'S JOKE

The officers of the Mafeking garrison were at mess—and what a mess!

"Cheer up, lads," remarked Col. Baden-Powell, taking his second helping of mule steak. "We might be worse off."

"Indeed? I can't imagine it," growled the dyspeptic major.

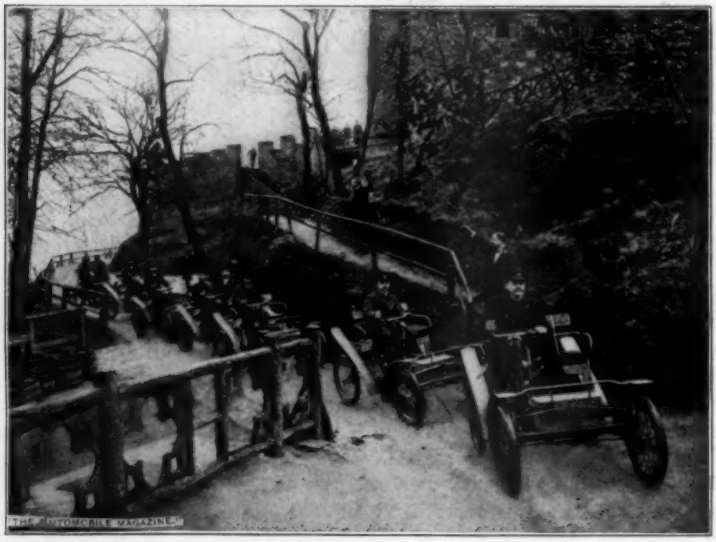
"Well, just fancy our diet if the automobile had been introduced here."—*Collier's Weekly.*

The Automobile Abroad

(By Our Own Correspondent)

THE most notable event of the season is the formation of the new organization, the Moto-Club de France. It is significant as denoting a democratizing tendency which is making the automobile a more popular and universal instrumentality of progress and taking it beyond the aristocratic and plutocratic auspices that have exercised the sponsorship so largely up to the present time. The significance of the new departure is evident from the fact that the founders of the Moto-Club have been most prominent in the membership of the Automobile Club, and, for the most part, original members of that organization—men like MM. Serpollet, Paul Meyan, Pierre Giffard, René Varennes, and J. Berlier, all members of committees. These, together with M. Ernest Archdeacon and forty other members of the Automobile Club, formed the nucleus of the Moto, which evidently has an important future. The impetus was given at the annual meeting of the Automobile Club, when the President announced that out of a budget of 361,000 francs only 5,000 francs would be allotted for racing purposes. There had been a growing feeling that the encouragement of automobile interests has been subordinated to social considerations, and this announcement precipitated matters. Immediately on the close of the meeting active steps were taken to organize the Moto-Club. The Automobile Club is dominated by aristocratic influences, and with its palatial quarters it has become one of the most luxurious clubs of Paris. It is noteworthy how the club that represents the mechanical substitute for the horse takes its color from the sporty, fashionable aspect of the new instrumentality and thereby has become a rival of the Jockey Club, which represents the sporty and fashionable aspect of the horse itself. The club, therefore, is too swell in its character to suit many serious devotees of the automobile, and their dissatisfaction has been aggravated by the fact that the controlling interests in the club are hostile to the government and therefore without influence in furthering the automobile cause affected by regulative and restrictive tendencies. The Moto-Club, on the other hand, is to be confessedly democratic in character. It will be unpretentious in form, will have no club-house but simply a spacious apartment requiring but a moderate rental. It will make the encourage-

ment of the automobile industry its special aim, and therefore will find particular favor with manufacturers. Expenses being kept down, there will be considerable sums available for encouragement of automobile interests in various ways. There is not, necessarily, any antagonism between the old club and the new, and their aims being so different there is room for both. Many members of the Moto will retain their membership in the Automobile. The fact that Paul Rousseau, who started the secession movement by his indignant remarks at the Automobile Club's annual meeting, is a member of the Moto, gives assurance that



An Automobile Ride to The Wartburg

it will be the centre for automobile sporting interests. Although the Moto has been nicknamed " l'Automobile Club des Pauvres " by the older club, the relations between the two clubs will probably be amicable.

The Council General has allowed 100 francs for showing at the Exposition an important set of documents relative to the corporation called the Federation Centrale des Chauffeurs-conducteurs-macaniciens.

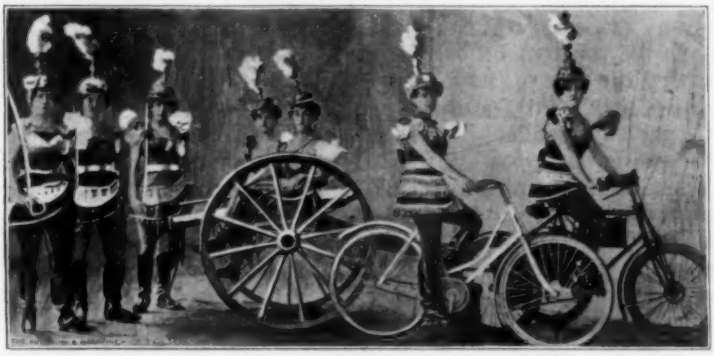
A correspondent of *La France Automobile* writes from Narbonne advocating the employment of two motors in automobile

practice, one for regular work and the other as an auxiliary, to come into use on difficult pieces of road.

Julius Loewy, Director of the Extrablatt of Vienna, recently made the journey to Paris by automobile. He took ten days for the trip, making it in short stages, very comfortably and with great pleasure.

The eminent automobilist, M. Ernest Archdeacon, having been arrested for violating the new regulations limiting the speed of automobiles to 20 kilometres an hour, proposes a competition in the Bois de Boulogne, offering to forfeit 10,000 francs if he cannot surpass a cab-driver in stopping and turning at the same rate of speed.

The Touring Club of France shows at the Exposition a "carte electrique" that presents nine complete itineraries, with



A Scene from "How Berlin Laughs," at the Metropol Theatre, Berlin

Paris for the centre, showing a development of 2,500 kilometres and covering more than 5,000 kilometres.

An automobile service has been established between the bureau of the New York *Herald,* in the Avenue de l'Opera, and Fontainebleau.

General Gallieni is to be accompanied to Madagascar by Count de la Valette with six automobiles.

I have mentioned the fact that automobiles famous for records bring prices occasionally that compare with the sums given for swift and cup-winning horses. Your young countryman, Mr. A. C. Bostwick, who, as son of the Standard-Oil magnate and multi-millionaire, evidently has "money to burn," lately arrived here from the United States and has taken an active part in automobile sports, purchasing for $12,000 the 20 horse-power

automobile with which M. René de Knyff won le Tour de France last year and this season the race from Paris to Nice. With his purchase Mr. Bostwick participated in the Bordeaux-Perigueux-Bordeaux race of June 3 and 4, the great meeting of the year for southwestern France. Mr. Bostwick had for his particular rival M. Levegh, with a vehicle of the same power, and was beaten by four minutes, which, in a race of 116 kilometres, means 4 kilometres, or 2½ miles, ahead. Much, therefore, depends on the handling of the machine; a veteran like M. de Knyff would probably have been an easy victor. Your countryman appears to have achieved very speedily a promotion to the ranks of the aristocracy, for I note that in the accounts of the race given in the press his name is given as " de Bostwich."

Baron Arthur de Rothschild lately made the journey by automobile from Paris to Homburg, in Germany, in sixteen hours, by way of Strasburg, Stuttgart, Heidelberg and Frankfort. He made the run to Homburg from Frankfort in eighteen minutes, beating the time of the fastest train by seven minutes.

An important feature of the Exposition is the collection of military automobiles. There are twelve of these, representing as many different types. Of these two are operated by steam, one by petroleum and nine by gasoline. These include a heavy tractor for use in artillery and engineering service, a medical wagon containing an equipment of surgical apparatus, medicines, etc., besides a folding tent for conducting operations. A telegraph wagon contains a complete outfit of apparatus for field use, and another vehicle is for transporting telegraphic materials. There are also an automobile for the military postal service, an omnibus for the transportation of personnel, a vehicle for the commanding officer, a rapid automobile and a smaller vehicle for the use of officers, a motocycle for the transmission of dispatches, etc. They were built by various prominent manufacturers. The greater number are painted a uniform gray, which is the color of the army and marine palace on the Seine, near the Champ de Mars.

July is to be a great month for automobile sports at the Exposition. The director of the sports, your countryman, Mr. A. G. Spalding, has given out the following programme:

Contest of speed for all vehicles, divided into three classes, according to the classification given in the rules of the Automobile Club of France for 1899. This contest will take place under a special provision yet to be asked of the authorities.

The vehicles will run during one week, Thursday excepted, five heats, or from 300 to 400 kilometres each, starting and

finishing at the Pont de Joinville. The carriages will be sent out in file from the ground of Vincennes to the Pont de Joinville, from which point the departure will be timed. On the finish the carriages will be timed at the Pont de Joinville. From there they will pass to the track of Lake Dumesnil, of which they will make two circuits. An optical telegraph and semaphores, established at the track of Dumesnil, will announce the arrival of the carriages at the Pont de Joinville.

Prizes—Class I., Carriages. Nine cash prizes. First prize, 8,000 francs; second prize, 6,000 francs; third prize, 5,000 francs; fourth prize, 4,000 francs; fifth prize, 3,000 francs; sixth prize, 2,000 francs; seventh prize, 1,000 francs; two prizes of 500 francs each. Total, 30,000 francs.

Prizes—Class II., Voiturettes. Seven cash prizes. First prize, 4,000 francs; second prize, 2,000 francs; third prize, 1,000 francs; four prizes of 500 francs each. Total, 9,000 francs.

Class III., Motocycles. Thirteen cash prizes. First prize, 2,000 francs; second prize, 1,500 francs; third prize, 1,000 francs; four prizes of 500 francs each; six prizes of 250 francs each. Total, 8,000 francs.

In the month of March the number of horse accidents in France was 718, while the railway, the bicycle and the automobile are to be credited with 170 between them. The horse was responsible for 52 deaths. The bicycle accidents numbered 75, including 5 deaths. There were 52 automobile accidents, 4 of them fatal. The lowest number of accidents was due to the railway, but out of the 43 there were 13 deaths.

The transportation charges for automobiles on the French railways are so high that it costs 259.25 francs to carry a vehicle of 350 kilograms from Paris to Nice, while from Paris to Berlin, owing to the moderate charges on the German railways, the cost is only 94.75 francs.

The military authorities in France have ordered a number of traction engines, each of which will draw a train of 30 to 40 loaded wagons. For turning corners an ingenious form of coupling has been adopted, so that the entire train follows exactly the curve described by the engine. The wagons may be left at given points, one by one, and drawn to their destination by horses, if required.

The new Rallye Auto-Club has established a chalet at Meulan in a beautiful situation close to the Seine, with fine opportunities for boating. The day of the inauguration was marked by an automobile canoe-regatta, promoted by the Cercle de la Voile.

The feature of motocycle races has been successfully intro-

duced into the cycling programmes for the Parc des Princes here in Paris. Now that indiscriminate road-racing is under the ban, the French public is reconciling itself to the confinement of the sport where it properly belongs as a racing feature—on a special track within enclosed bounds. The motocycle races are therefore a most attractive feature.

Wherever go the French, good roads are sure to come into being, and the automobile follows as a matter of course. This is true of Madagascar, where an automobile service is to be established between Mahatsaro and Antananarivo, a distance of 250 kilometres.

Salute to Passing Automobilists

At the Vincennes *fête automobile* there were 25,202 persons who paid for admissions.

The casualties resulting from the thousand-mile tour were only four, and the subjects were all animals: a dead dog, a broken-legged horse, a hen and a sheep.

Miss Mary E. Kennard, who went through the thousand-mile tour in one of the smaller vehicles, writes, in the *Motor-Car Journal:* "We proved that the voiturette of to-day is not a mere plaything, but a vehicle capable of surmounting steep gradients, of carrying its passengers in safety over good roads and bad, and of doing 120 miles in the day."

The Automobile Abroad

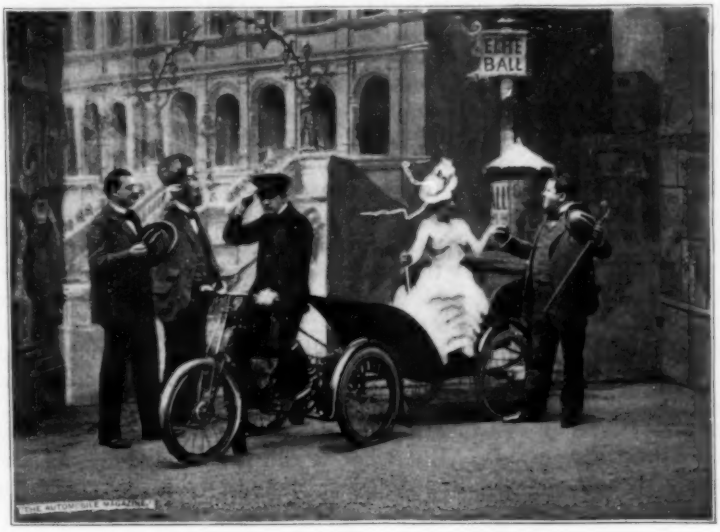
In Scotland a motor-vehicle service is to be installed between Aberdeen and Torry.

The Salon de l'Automobile et du Cycle, at Antwerp, held late in May, was very successful and was visited by about 10,000 people.

In Spain an automobile company has been formed to transport passengers and freight between Logrono, Soria and Osma.

It is said that the Italian Ministry of War has decided to substitute the automobile for animal traction so far as possible.

A novel form of accumulator, invented in Turin, is reported to give excellent results.



A Scene from "The World Reversed," at the Metropol Theatre, Berlin

At Turin recently, at the conclusion of a three-days' automobile meet, Gasté made some road-trials at short-distance records and succeeded in bettering by one-fifth of a second the Beconnais record for two kilometres with flying start.

The Thuringian City of Eisenach is the home of the Mitteldeutscher (Central German) Automobil Club, as well as an important centre of automobile manufacturing. Eisenach has the good fortune to have a rarely beautiful and picturesque environment, offering many delightful tours. The first excursion of the season was to the famous old castle of the Wartburg, near at hand. The Wartburg was never a ruin, having by good

fortune escaped the devastations of the thirty-years war and other periods of strife that destroyed the greater number of the evidences of ancient days in the land. It is the best preserved and the most beautiful old castle in Germany—a perfect example of feudal architecture, rich in history, legend and tradition, the centre for the assembling of the Minnesingers in their contests of song, and consequently the scene of Wagner's "Tannhäuser," and also the residence of Martin Luther during an important period of his life. It was here that Luther worked on his translation of the Bible that created the German language as a literary tongue as well as revolutionized the religious world. The place where Luther flung the devil out of his inkstand against the wall while engaged in this sacred duty is still shown in the "Lutherzimmer," or Luther-chamber, but the huge blot of ink made by his Satanic Majesty on coming in violent contact with the wall has to be renewed occasionally to make good the depredations of tourists. The summit of the hill occupied by the castle is nearly 700 feet above the level of the valley, and so precipitous are the sides that the attempt to ascend it by automobile looks to the stranger an impossible undertaking. But the tortuous road rises by easy grades and our excursionists found it a really light task. On arriving the party was hospitably taken in charge by the Captain of the Castle, Major von Cranach, a descendant of the world-famous painter of that name and an enthusiastic automobilist. Familiar as the Wartburg may be to a visitor, the enchanting prospects which it commands, beheld from a foreground so romantically picturesque, never pall upon one, and the automobile visitors from the neighboring city enjoyed the occasion most thoroughly. But what would Luther and the Minnesingers have said to the procession of automobiles invading the historic precincts? Would it not have seemed like a segment of the Apocalypse, more wonderful and dreadful than the seven-headed beasts and other monsters of the apostle's vision?

As preliminary to a long-distance mountain tour in the Thuringian Forest, instituted by the Mitteldeutsche Automobil-Club for Sunday, May 6, the evening before was devoted to a conference of representatives of various automobile clubs throughout Germany, with a view to the formation of a national league, or "bund." Steps were taken toward this end at Heidelberg three months before, but the project there framed fell through. The clubs represented were the Deutscher and the Mitteleuropäischer Motor-Wagen Verein (Central European Motor-Carriage Society) of Berlin, Rheinischer of Mannheim, Fränkischer of Nuremberg, and the Frankfurter of Frankfort-on-the-

Main, beside the Mitteldeutscher of Eisenach. A committee was appointed to call a meeting of representatives of all the German clubs at Berlin, to consider articles of federation. By means of such a federation it is expected that an important influence will be exerted upon legislation, and that the adoption of restrictive measures that might be highly injurious to automobile interests prevented.

The start for the trip was witnessed by a huge crowd, but order was preserved and security assured by the employment of bicycle riders as couriers, so that with all the crowding there was not even a hint of accident, either to spectators or automobiles. The course lay from Eisenach by way of Waltershausen, Oberhof and Zella, to Meiningen and thence back to Eisenach. The way was of such a mountainous and uneven character that the participants, including men of experience in some of the longest automobile journeys in Europe, declared it the most difficult they had ever rode over. That the trip was made with comparatively little difficulty testifies to the sturdy endurance of the automobile.

The Deutscher Automobil-Club of Berlin opened its palatial new house opposite the Reichstag building and fronting on the noble park, the Thiergarten, under the protectorate of the Grand Dutchess Anastasie of Mecklenburg-Schwerin and the Presidency of the Duke of Ratibor.

The attractiveness of the automobile as a stage-feature finds a remarkable instance in its use in the spectacular operetta, " Verkehrte Welt " (The World Reversed), which is played to crowded houses in Berlin.

Even in the far-away Malay peninsula the automobile is about to take possession of the field, the Malay Transport Syndicate, Limited, having been organized to establish regular transit services between the different centres of that thickly populated region. The roads there are excellent, as a rule, so the opportunity offered is a tempting one. The principal mode of conveyance is at present the slow-going bullock cart, and it will be a long jump from that to the swift automobile. The tiger has been the terror of the solitary farer on the highways in that region, and even wheelmen hesitate to use the fine roads, as otherwise they would. But the " striped terror " would probably hesitate at pouncing upon a passing automobile.

Trend of Progress of the Automobile

By R. H. Thurston

Second Paper

SEVENTY years, two generations, ago (1831) a committee of the British Parliament, after a long and painstaking investigation of the working of automobiles in and near London—where there were, a little later, twenty or more at work, traversing thousands of miles and carrying thousands of passengers annually—after consulting the great mechanical engineers of the day and catechising the inventors, makers and users of the machine, and after cross-examining their opponents among the stage-coach proprietors and drivers, reported that they had become convinced that "the substitution of inanimate for animal power, in draught on common roads, is one of the most important improvements in the means of internal communication ever introduced." They considered its practicability to have been "fully established," and predicted that its introduction would "take place more or less rapidly, in proportion as the attention of scientific men shall be drawn, by public encouragement, to further improvement." The success of the system had, as they stated, been retarded by prejudice, adverse interests and prohibitory tolls; and the committee remark: "When we consider that these trials have been made under the most unfavorable circumstances, at great expense, in total uncertainty, without any of those guides which experience has given to other branches of engineering; that those engaged in making them are persons looking solely to their own interests, and not theorists attempting the perfection of ingenious models; when we find them convinced, after long experience, that they are introducing such a mode of conveyance as shall tempt the public, by its superior advantages, from the use of the admirable lines of coaches which have been generally established, it surely cannot be contended that the introduction of steam-carriages on common roads is, as yet, an uncertain experiment, unworthy of legislative attention."

Gurney had run his carriage between 20 and 30 miles an hour; Hancock could sustain a speed of 10 miles; Ogle had run

his coach 32 to 35 miles an hour, and ascended a hill rising 1 in 6 at the speed of 24½ miles. Summers had traveled up a hill having a gradient of 1 in 12, with 19 passengers, at the rate of speed of 15 miles per hour; he had run 4½ hours at 30 miles an hour. Farey thought that steam-coaches would be found to cost one-third as much as the stage-coaches in use. The steam-carriages were reported to be safer than those drawn by horses, and far more manageable; and the construction of boilers adopted—the "sectional" boiler, as it is now called—completely insured against injury by explosion, and the dangers and inconveniences arising from the frightening of horses had proved to be largely imaginary. The wear and tear of roads were found to be less than with horses, while with broad wheel-tires the carriages acted beneficially as road-rollers. This parliamentary committee finally concluded:

"(1) That carriages can be propelled by steam on common roads at an average rate of 10 miles per hour.

"(2) That at this rate they have conveyed upward of 14 passengers.

"(3) That their weight, including engine, fuel, water, and attendants, may be under three tons.

"(4) That they can ascend and descend hills of considerable inclination with facility and safety.

"(5) That they are perfectly safe for passengers.

"(6) That they are not (or need not be, if properly constructed) nuisances to the public.

"(7) That they will become a speedier and cheaper mode of conveyance than carriages drawn by horses.

"(8) That, as they admit of greater breadth of tire than other carriages, and as the roads are not acted on so injuriously as by the feet of horses in common draught, such carriages will cause less wear of roads than coaches drawn by horses.

"(9) That rates of toll have been imposed on steam-carriages, which would prohibit their being used on several lines of road, were such charges permitted to remain unaltered."

The one positive obstruction, legislation for adverse interests, practically killed the automobile before 1840, although here and there an inventor or an enthusiastic automobilist struggled against all artificial as well as natural impediments.*

The Commercial Evolution of the lighter automobile systems practically dated from about 1895, though a few makers and users were earlier in the field after the renaissance of the art. In fact, here and there an enthusiastic mechanic and inventor has

*The writer rode in a steam automobile as late, or early, as 1860.

operated automobiles, usually with steam as the motor, from the time of the decadence of 1833. But the recent remarkable evolution of so many competing systems and classes of motor has given an interest coming of wider competition that the enterprise formerly lacked and has aided in the stimulation of the development of the automobile most wonderfully. Within two or three years, the business of manufacture of all practicable—and of some utterly impracticable—forms of automobile has been undertaken by many capitalists, mechanics and engineers, and in some cases on a very large scale. Electric, steam and petroleum motors seem to have come to stay, each for its special work.

With a hundred, possibly two hundred, manufacturing and exploiting companies in the field, it is obvious that a majority must soon "go to the wall"; but there will undoubtedly, legislation permitting, be a few systems which will conquer all obstacles and a few companies that may secure a market and make a financial success with mechanically practicable forms of vehicle. There will unquestionably result complete failure with the great mass of ill-considered and amateur schemes. There are now a very few, not a half dozen, making the electric automobile, about as many producing the internal-combustion machine and a somewhat smaller number building the steam-automobile. There were, probably, January 1, 1900, less than a thousand automobiles, of all classes, actually operated in this country, and not half that number with entire satisfaction. Perhaps two-thirds of these machines are electric and these are mainly employed in the large cities.

The progress of the automobile has been particularly rapid during the year just closed, especially in England, where the statute which has at last freed all such vehicles so generally from the earlier restrictions has been productive of an immense advantage, and in this country, where native inventive genius has only recently been generally and earnestly attracted toward this great and now most promising field. Should the evolution of the automobile continue unrestricted by unfairly discriminating and hampering legislation, either due to real apprehension of danger, in cities and on the highways, or through the tendency of some legislators toward "strikes" against enterprises involving the extensive use of capital, the progress of the immediate future seems likely to be in the nature of an acceleration, and of astonishing rapidity, extent and importance. The art has passed well through its preliminary stages of experimentation in the cases of the steam-engine as a motor and of the electrically impelled vehicle, and probably is well-advanced in the field of internal-

combustion motors and of carriage construction. Even progress in the use of the heavier and safer petroleums, both as fuels and as working fluids, is exhibiting some marked advances. Petroleum-spirit motors, however, have thus far led this advance and have a long start in this respect. The French have hitherto been in the van in the operation of the latter class, and England with steam-motors; but the indications are that the United States will soon be an acknowledged leader in all lines of improvement of the automobile, as previously with the bicycle. In electric-motor construction, the difficulties still remain largely with the accumulator, or storage battery; the size, weight and cost of which have not been greatly reduced, except at the sacrifice of durability and reliability. Should the storage battery become satisfactory in all respects, we may look for an enormous advance in that line of work; although in that direction, as in all others, the shadow of the professional speculative promoter of the giant corporation —on paper—falls heavily over legitimate enterprise.

The automobile now finds its way into every part of the civilized, in fact into many portions of the uncivilized, world. Large numbers have been sent to South Africa for use in supply-trains and the transfer of horses to the seat of war in such immense numbers has caused their replacement in London streets by the "auto-vans," now almost as numerous as were, formerly, the omnibuses, and, it is reported, with a very appreciable economy. Profits on sales of horses and gains by use of the automobile are together adding greatly to the dividends of the companies. In this country, electric cabs and other vehicles are coming into use extensively in our large cities, and the Baltimore and Ohio Railroad passenger department is about establishing such a cab-service in Washington, with a fifty-cent fare. A well-proportioned automobile will traverse any respectable road and go wherever the horse can fairly be expected to travel. It should ascend a ten-per-cent. grade readily and ride over obstructions that would stall any horse-drawn wagon. Ice may stall it, but snow should obstruct its movements less than those of the horse and its carriage.

Washington insisted on the promotion of national roads and the encouragement of the production of horses for transportation. Hamilton recognized the influence of facilities for transportation in the promotion of the industrial advance of the country, and we all to-day see clearly, as never before, that every new method of improved transportation is a great gain. Motor wagons and carriages have probably now come to stay with us, and the displacement of the horse in commercial work generally, and possi-

bly even in a considerable degree in pleasure travel, seems certain to occur soon. Self-propulsion is itself an enormous advantage and the improvement of the roads by the substitution of effective road-rolling, in the use of the vehicle, for the destructive action of the hoofs of horses is also a larger gain than is commonly realized; while release from the physical defects of the horse used as a motor is, sanitarily and psychologically, hardly less important.

Rated Powers of motor-vehicles are often greatly over-stated, and the automobile rated at 2 or 4 or 10 horse-power is often found, under the truth-revealing test of the Prony brake, to be capable of working up to less than two-thirds, sometimes less than one-half, its stated power. On a good pavement, and with a light carriage, one and a half or two horse-power proves quite sufficient for any safe speed over any usual city-gradients, and a rated 4 horse-power motor may thus not fail in its work under any ordinary conditions, even though far below its rating in actually available power. A correct rating, however, as established by the brake, is essential to a real knowledge of the action of the machine and to its intelligent design and improvement. The correct rating is the power it is capable of exhibiting at any time, and for any length of time, under the brake when at its regular and normal speed, precisely as if in operation in its place in the automobile on the road.

The difference in power required on a level and ascending a hill, or on a smooth and on a rough road, is rarely appreciated by the automobilist-amateur; though familiar, through many trying experiences, to the old hand. Two horse-power, actual and deliverable against the brake, will, on a good road, drive an automobile weighing 750 to 800 pounds 12 miles an hour easily, but on moderate up-grades the speed will fall to 8 miles or less. In some cases, on a smooth pavement, this expenditure of power may drive the carriage at the rate of 15 and 18 miles an hour on the level. With good speed-changing gear, the engines or motors may be made to deliver their full power at whatever speed of carriage the varying grades may cause the work to be done, and, if one choose, the power available at low speeds, rising a hill, may be made higher than that employed at high speeds on the level. Twelve or fifteen hundred pounds of carriage and passengers may be propelled, on a level, at 20 miles and upward by 4 or 5 horse-power; but a grade rising but 200 feet in the mile will pull down the speed to perhaps 15 miles an hour. Ten horse-power per ton should give some such figures as the above, if the motor supplies the power for which it is rated, or say a half horse-power

for each hundred pounds of carriage and load. The actual power required on a very smooth level road, as an asphalted street or a good macadamized suburban road, would be properly not far from 1 horse-power to 500 pounds weight transported, including the automobile itself, for 10 miles an hour, 1½ for 15 miles, 2 for 20 miles, 3 or 3½ for 25, and 4 or 5 for 30 miles an hour. These figures are increased about twenty-five per cent. for each increase of elevation of *one* per cent. or of 50 feet to the mile. Four or five per cent. is not an uncommon elevation in even comparatively level countries and grades of ten per cent. and upward must be encountered occasionally in hilly districts. An actual 10 horse-power machine, of a thousand pounds weight, with its load, which may speed up to 30 miles an hour under the most favorable circumstances, may fall to one-third that speed on a less than ten-per-cent. rising gradient.

The Wheel Resistance alone of a wagon or carriage on the city street may be taken as from 40 pounds per ton on asphalt, to 50 pounds on a smooth cobblestone, and 60 to 75 on macadam pavement, smooth and rough. These figures correspond to about three-quarters of a horse-power at the lower limit, and to one horse and one and a quarter at the higher resistances, at 7 miles an hour, or to from one to one and a half or three-quarters at 10 miles an hour. One horse-power per ton at 10 miles an hour, for good construction of vehicle and roadbed, may be considered perhaps a fair average figure in city work, and a maximum speed, and three-quarters of a horse-power, or a trifle less, at the usual speed of 7 miles, increasing to a full horse-power on rough streets or with very moderate rising gradients. The horse, however, if compelled to work at 7 miles an hour in city work, cannot usually be depended upon to do more than about 20 miles a day, and thus exerts about one rated horse-power for only three hours a day working time.*

Automobiles would seem to be less affected, in speed and steadiness of action, by variations of condition of roadbed than are horses; but precisely why this should be, it is difficult to state with confidence. Possibly the inertia of the mass and the steadiness of the former, and the jerky and varying pull of the latter, may account for the difference. But automobile and horse-drawn vehicle are alike greatly affected by variation from a level track and it is elsewhere shown how both power and pull, as well as speed, are affected, as measured in terms of energy, work and pull. The automobile, as a rule, maintains a higher average rate

* See Transactions Am. Inst. Electrical Engineers, November, 1899. for the paper of Messrs. Sever and Fliess, in which are collected some of the most valuable data yet obtained.

of speed than the equine machine and thus utilizes a considerably larger amount of power. Where the horse averages 7 miles or 8, the automobile probably averages 8 or 9, or even 10. The resistance per ton at a given speed, with equally good construction and similar wheel-diameter should be the same. The weights, however, are not strictly comparable; since the automobile carries its own power and is thus debited with weight in excess by that amount; the weight of the motor in the other case being separately carried on its own feet and, in all usual data, left out of account. Further, the greater weight on the wheels of the automobile, where not fully compensated by increased breadth of tire, causes deeper wheel-track and higher resistance per ton than with the horse-drawn apparatus. But the competing automobile will do easily twice as much work per day, in commercial employment, as will the horse and can, if desired, be kept in action night and day, except that time must be allowed, with electric vehicles, especially, for charging, or, better, exchanging batteries or storage tanks. When the finances of the case are considered, the best automobiles stand far in advance of the best of the older system.

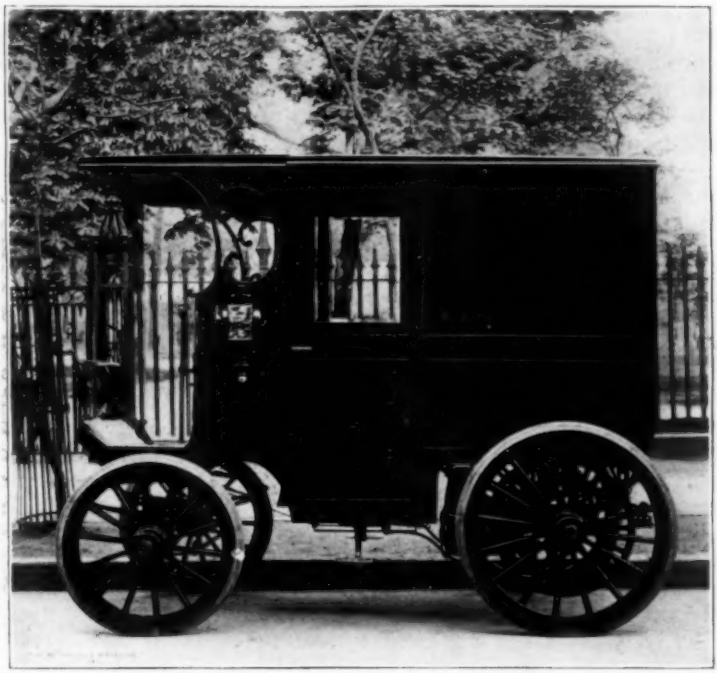
Fuels—Of the available fuels for the heat-motors, coal and coke are the cheapest and will presumably be ultimately found the proper fuels for purely commercial use, and the laws against smoke will probably compel the choice between anthracite and coke. The crude oils and the tarry and other by-products of gas-making follow in availability and costs and have advantages in heat-production for the unit weight or volume and also in their convenience. The petroleums are of highest value and the safest petroleums are most costly and are most troublesome in use in the internal-combustion engine. Heat-contents range from 10,000 to 15,000 *B. T. U.* in the coals, to 20,000 *B. T. U.* per pound, in the oils. Liquid fuel is much superior in stowage, both in condensation into minimum volume and weight and in convenience of handling. Unpleasantness in handling, however, noisome vapors, and their explosive character in the case of the lighter fluids, and, even the noisy combustion, are disadvantages of no small importance. Vaporizers and atomizers are often troublesome and the heavy petroleums and tarry products do not always work steadily and with certainty.

(*Third paper next issue*)

Electric Delivery Wagon

THE delivery wagon shown in the accompanying illustration is one of three electric delivery wagons built for B. Altman & Co. by Frederick R. Wood & Son, of New York City.

The novel features of these wagons lie in the gear and in the arrangement of body, which is of the brougham type. Side



doors are provided, enlarging the body materially, as the carrying capacity is precisely double that of the type of Altman wagons familiar to New Yorkers. The total length being but ten inches longer than the latter type. Great care has been taken in the finish and upholstery, which is equal to any fine carriage.

The speed of these wagons is ten miles per hour and thirty miles on one charge is attained.

Forty-four cells of the chloride battery are placed in the body, distributed in three crates in the rear and one in the front.

Thirty-six and forty-two inch wheels are used on front and rear, respectively.

The Gibbs Pedestal Gear is used, making it possible to hang the body lower than is customary, which adds to the appearance materially.

This gear is an adaptation of the familiar pedestals used on locomotives, and consists of pedestals bolted to the sills, in which the axles are free to move vertically. There being no reaches running fore and aft and connecting the axles, each axle is free to move independently of the other and thus no destructive strains are transmitted to the gear. All strains of driving and also those encountered on rough roads are taken directly by the pedestals and not through the leaves of the springs.

The motors are of a new type designed by the General Electric Company, as are also the controllers.

Rawhide pinions of large pitch and face are used to minimize the noise, and after long test it is found that they last fully 5,000 miles.

American Gasoline Runabout

THE illustration shown herewith represents the 1900 model Gasoline Runabout of 4¼ horse-power manufactured by the Autocar Company, Ardmore, Pa. The total weight of the carriage is 650 pounds. This includes sufficient water and gasoline for a run of 70 miles over ordinary roads. The running gear is constructed of steel tubing, the front and rear axles revolving on ball bearings. The compensating gear, which allows the vehicle to turn corners freely is all incased in a malleable iron casing. A band break, which is operated by the foot, is applied to the rear axle so that, in case the chain should break, the occupant of the vehicle can prevent it from running away. The body is of size sufficient to seat two persons comfortably. One controlling lever governs the variations of speed and reverse. The speed ranges from about 2 miles up to 18 or 20 miles per hour, the slow speed being the hill climbing device.

The gasoline is carried in a nickelled cylindrical can at the rear of the seat. The motor is of the four-cycle type, having two cylinders, and the crank set at 180 degrees. The button, which is shown on the lap of the seat, is connected to the gasoline vaporizer, which is automatic at any speed.

In the front of the vehicle and under the foot-board is located

American Gasoline Runabout

Gasoline Runabout of the Autocar Company, Ardmore, Pa.

a large radiating can for the circulating water. Water from the water jacket is forced through this radiating can by a small centrifugal pump.

The transmission of power from the motor to the rear axle is by means of chain and sprocket, and the variable speed mechanism is said to be entirely new. The muffler, which in the illustration will be seen under the body and below the seat, is sufficiently large and effective. Wire wheels with 2½-inch pneumatic tires are used. All parts of the gear are handsomely painted and nickeled.

This type of carriage is made either with a spindle seat of the runabout type, or with hood and storm apron, the latter being particularly adapted for physician's use.

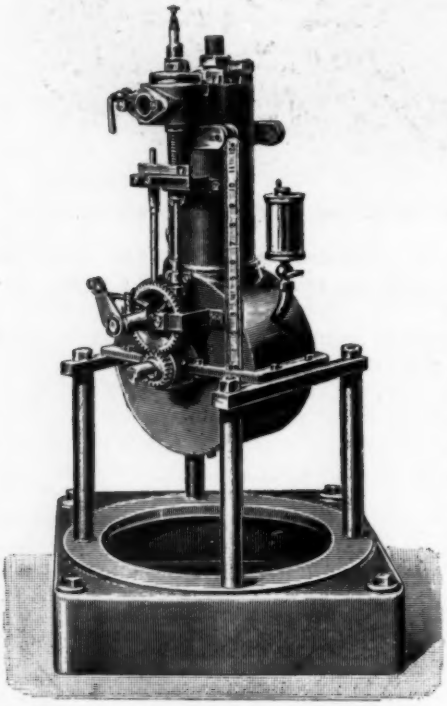
The oiling of the motor and various parts is automatic, a small pump supplying the oil from a reservoir to the different bearings and cylinders in proportion to the speed at which the engine is running.

The engine varies in speed from 300 revolutions to 1,000, having, in addition, a variable speed mechanism in the countershaft. The under frame, which is supported by the springs, carries all the machinery and mechanism so that the body of the vehicle can be changed.

The ignition of the motor is furnished by a dynamo of special design, which gives the motor an explosion by one revolution of the fly-wheel.

The Wellington Motor

THIS motor, which we illustrate herewith, is entirely of British design and manufacture, having been designed by Mr. J. Morecraft Wellington, engineer of the company, and built by Messrs. The Wellington Motor Car Company (Limited), of No. 37 Victoria Road, Battersea, S. W. It is intended for use in the smaller class of automobiles, such as voiturettes, dog-carts, etc. It comprises a single vertical cylinder bolted to an enclosed crank chamber. So far it follows conventional lines. There are, however, several mechanical details about it which serve to differentiate it from others of its type. The cylinder is 3 inches diameter by 4 inches stroke. It is water-jacketed, as is the cylinder cover. These jackets are quite independent of each other, and the cover can be easily removed for inspection, the joint between the cover and cylinder head being metal to metal, forming a V joint—no packing of any kind being used.



The crank or fly-wheel chamber is in two portions, which are united by horizontal flanges bolted together. It is thus very easy to get at the main bearings and cranks. Ball bearings of a special type are used in these important parts, and from repeated tests made with them and plain ones, Messrs. The Wellington Motor Car Company

The Wellington Motor

(Limited) find that by the use of ball bearings they save, so they assure us, quite half a horse-power. The inhaust and exhaust valves are neatly arranged so that either can be quickly overhauled without disturbing the other, the inhaust valve being placed immediately over the piston, which thus gets the full advantage of the explosive impulse.

The make and break mechanism of the electrical ignition is so arranged that no oil which is used to lubricate the distributing gear can possibly get on to it to so spoil the contact, as it is placed high up on the side of the cylinder. We should state that this is, of course, a second motion shaft as seen, the motor working on the Otto cycle and using petrol as fuel. This motor has been very carefully and repeatedly tested, with the mean result that at 1,400 revolutions per minute it gives 3.8 B. H. P. It is, however, classed by its makers as a 3½ H. P. motor, so as to allow a margin within which it can be guaranteed. Its weight is, exclusive of induction coil and batteries, 110 lbs., and the consumption of petrol, at full load, being ⅞ pint per H. P. hour, and at half load ⅝ pint per H. P. hour; the cost of running being thus (taking petrol at 11⅞d. per gallon) 1⅛ d. per H. P. per hour.

We have inspected the motor and can testify that it is thoroughly well made and substantial. It should prove a very reliable one in ordinary hands. We understand that Messrs. The Wellington Motor Car Company (Limited) are manufacturing motors of this type for the trade, and as there are no royalties or license fees they can be produced at a reasonable price. One of these motors will be exhibited at the forthcoming exhibitions.

The Iron-Clad Pneumatic Tire

OUR engraving shows a section of a new type of pneumatic tire, of which the exterior is protected by an endless band of rubber provided with small juxtaposed plates of iron and secured to the envelope by vulcanization.

Some of the advantages claimed for this arrangement are as follows: The springing of the tire from the rim is prevented; the tread does not, like one of rubber, slide upon wet or slippery ground; and the metal renders any chipping, fissuring or puncturing of the rolling surface impossible.

This tire, although iron-clad, preserves its full degree of elasticity and its own independence. It rolls, in a manner, upon the band that invests it, and, while yielding under the pressure of an obstacle, is incapable of adapting itself so readily as rubber to cavities in bad pavements, or of binding in the tracks of street railways. The use of the band under consideration also greatly reduces vibrations. The increase in weight is insignificant, say about four and a half pounds for a wheel of ordinary dimensions. For light weights, moreover, the iron may be replaced by aluminium, which will render the envelope as light as any of the ordinary kinds.

At first sight, it might seem as if these iron plates would produce a noise like the rattling of a lot of scrap-iron; but, as a matter of fact, they roll as silently as does an ordinary unprotected rubber tire.

Several carriages are now provided with this tire, and it is to be hoped that the experiments that are being made with it will give satisfactory results.

New Accumulators for Automobiles

AMONG the accumulators tested at the ever-memorable *concours* of the Automobile Club de France, few, indeed, attracted more attention than the battery made by the Société pour le Travail électrique des Métaux. The plates of this battery are not homogeneous, both being of different types.

As Fig. 1 shows, the positive plate is composed of a number of superposed, waved bands of lead 0.5 mm. (0.02 in.) thick and 8 mm. (0.32 in.) wide. These bands engage two leaden rods which divide the plate into three equal parts in the direction of

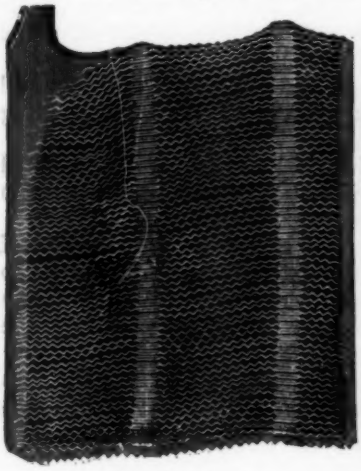


Fig. 1. Positive Plate

Fig. 2. Negative Plate

its width. Where the leaden rods cross the bands, the latter are reinforced by small pieces of lead, which also serve the purpose of separating the bands. At the edge of the plate opposite the connecting piece, each band is again strengthened; and these additional reinforcing strips are soldered together so as to form one of the upright posts of the plate. On the side of the connecting piece the bands are embedded in a much heavier soldering, from 4 to 5 mm. (0.16 to 0.20 in.) wide, constituting the second post. Finally, the entire series of bands is held in place between the two by a light soldering which secures each end of the two

rods, previously mentioned, to the uppermost and lowermost bands. There are 120 superposed bands, each having a useful length of about 120 mm. (4.8 in.). The active surface of the plate has an area of about 25 sq. decimetres. As each element is composed of 7 plates, the total active surface for 120 ampère-hours is 1.58 sq. decim., which corresponds, for a normal discharge of 120 ampère-hours, with 0.76 ampère-hours per sq. decim. of active surface.

As illustrated in Fig. 2, the negative plate is formed of a rectangular block of antimony lead divided into two equal parts. Each of these parts is again divided into four cells by three horizontal cross members. The cells are 56 mm. (22.4 in.) long and 50 mm. (20 in.) wide; and the paste which they contain is pierced with nine holes. The proper distribution of the current in these larger paste-blocks is assured by intermediate divisions which trisect each paste-block or " pastille " as it is called. Corresponding divisions on each side are riveted together. The pastilles are composed of lead chloride.

The piece connecting the positive and negative plates is located at one side, almost in the prolongation of the corresponding vertical side post.

Plates of like polarity are electrically connected by a small leaden bar soldered on the plates. The plates are insulated from each other by sheets of waved and perforated ebonite.

The electrolyte employed is sulphuric acid having a density of 1.22 and containing about 1.33 grammes of $H_2 S O_4$; that is to say, almost 3 times the amount theoretically necessary for a capacity of 120 ampère-hours. At the end of the discharge the density falls to 1.162.

The cell is made of ebonite. The terminals project through a two-part ebonite cover, an opening being also provided to permit the escape of the gases.

POSITIVE PLATES

Number	7
Dimensions in centimetres:	
Height	20.2
Width	12.2
Thickness	0.8
Weight in kilograms	1.11
Approximate weight of the side posts in kilograms	0.15
Approximate section of the side posts in square millimetres (mm.^{2})	30.00
Approximate section of the connecting piece in mm.^{2}	30.00

New Accumulators for Automobiles

Active surface in dm.^{2}	25.00
Visible surface in dm.^{2}	5.

NEGATIVE PLATES

Number	8
Dimensions in cent.:	
Height	20.2
Width	12.2
Thickness	0.4
Weight in kilograms	0.5
Approximate weight of the frame in kilograms	0.25
Approximate section of the frame in square mm.^{2}	14.00
Approximate section of the connecting piece	22.00
Weight of active material in kilograms	0.25
Distance between plates in mm	4.00

CELL AND CONNECTIONS

Exterior dimensions in centimetres:	
Height	20.00
Length	13.70
Width	18.30

ELECTROLYTE

Weight in kilograms	4.90
Approximate volume in dm.^{3}	3.7
Density:	
End of charging	1.22
End of discharge	1.16
Total weight of complete element in kilos	19.10

The Phenix Accumulators

THE Phenix accumulators differ from most storage-batteries in so far as the electrodes have not the form of plates, but of numerous small cylinders.

Each of these cylinders is in turn composed of six elementary cylinders soldered end to end (Fig. 2). The elementary cylinder, as illustrated in Fig. 1 is composed of a leaden rod covered with a paste of active material. The rod has a diameter of 2 mm. and a length of 7 c. m. between the two shoulders with which it is

provided, the distance between the upper shoulder and end of the rod being about 5 mm.

The diameter of the pasted cylinder is 6 mm. The paste abuts against the upper shoulder. The lower shoulder, which is somewhat larger than the upper, slightly projects from the paste. The lower cylinder, moreover, supports a number of superposed ebonite rings which completely cover the cylinder. These rings are cut from an ebonite tube 0.3 mm. thick; each ring has a height of 0.1 mm.

Fig. 1. Phenix Electrodes

Fig. 2

The negative and positive cylinders are absolutely the same in construction.

The positive cylinders are soldered to one plate, the negative cylinders to another plate. These lead plates are superposed, the positive plate being uppermost. Positive and negative cylinders alternate. The lower plate is perforated to permit the passage of cylinders of a polarity different from those cylinders which it

connects electrically. Moreover, each of the plates is pierced with as many holes, of the diameter of the cylinder-cores, as there are series of cylinders.

An ebonite plate, apertured to permit the passage of the cylinders, rests on the lower part of the string of cylinders.

The lower portion of the rods enter the holes of a similar plate on a soldering at the end of each rod.

The weight of the electrolyte corresponds with 1,368 grammes of free acid ($H_2 S O_4$).

The cell is of ebonite. Although unprovided with a cover, it is closed by a layer of paraffine poured on the plates when the parts are all assembled. The layer of paraffine is apertured to provide a vent for the gases.

POSITIVE ELECTRODES

Dimensions in centimetres:	
Length	7
Diameter	0.6
Total weight in grammes	12.0
Weight of the support in grammes	4.0
Weight of the active material in grammes	0.0
Number of electrodes, $90 \times 6 =$	540.0

NEGATIVE ELECTRODES

Dimensions in centimetres:	
Length	7
Diameter	0.6
Total weight in grammes	12.0
Total weight of support in grammes	4.0
Weight of active material in grammes	8.0
Number of electrodes, $90 \times 6 =$	540.0

CELL

Dimensions in centimetres:	
Height	57
Length	12
Width	12
Weight in kilogrammes	1

ELECTROLYTE

Volume in $dm.^3$	3.8
Total weight in kilogrammes	4.8

Density:	
End of charging	1.274
End of discharge	1.22
Total weight of the complete element in kg	18.4

These elements have one grave defect—their construction is exceedingly difficult. In a battery of 44 elements there are no less than 47,000 soldered connections—a number which seems almost incredible.

Since the positive and negative electrodes are like in construction, the poles can be changed after the battery has been in use for a certain time. The advantages of this interchangeability are obvious.

The Fulmen Accumulator

IN the Fulmen storage-battery the active material is a paste held in a special lead grid. The positive plate is composed of two similar, superposed grids. The paste is contained in 30 rectangles, the exterior dimensions of which are 25.5 × 1.65 mm. (1.02 in. × 0.068 in.); the pellets are pierced with 8 holes.

The partitions which form the grid are 2.5 mm. wide; and the interior frame is 3 mm. wide. The junction of two partitions is strengthened by reinforcing strips.

The negative plate is like the positive with the exception that the partitions are not reinforced, and that each pellet of paste is formed with a small quadrilateral 0.5 mm. thick, which divides the pellet into twelve equal parts. Thus a network is formed which retains the active material.

The upper part of the frame of the two plates is slightly wider than the other sides and is provided with the connecting-bar, which is composed of lead and is circular in cross-section.

Plates of like polarity are soldered to a lead bar rectangular in form, and 15 × 4 mm. in size. The plates are supported above the bottom of the containing vessel by rubber brackets, the cross-sections of which are truncated triangles. The base of each triangle is of hard rubber; the truncated apex, of soft rubber. Waved, perforated sheets of ebonite separate adjacent plates.

The weight of the electrolyte is equal to 736 grammes of free acid ($H_2 S O_4$).

The containing vessels are of ebonite 3.5 mm. in thickness at the sides, 4 mm. at the bottom. They are covered by ebonite plates which extend 2 cm. into the interior of the cell. Each

cover is pierced with two lateral, circular holes, through which the connecting-bars pass, and with a central hole, closed by a plug, through which the gases can escape.

The elements are connected with one another by copper strips 0.2 mm. in thickness, clamped against the connecting-bars by copper nuts screwing on threaded bolts. The parts are all covered with vaseline.

POSITIVE PLATES

Number	10
Dimensions in centimetres:	
Height	18.3
Width	10.
Thickness	0.4

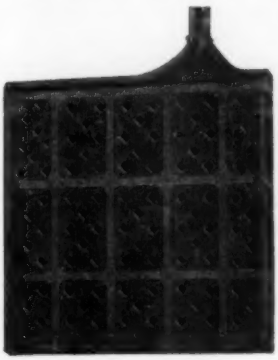


Fig. 1. Positive Plate, Fulmen Battery

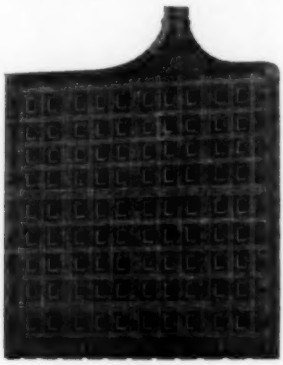


Fig. 2. Negative Plate, Fulmen Battery

Weight in kilogrammes	0.445
Weight of frame in kilogrammes	0.16
Weight of active material in kilogrammes	0.285
Section of the frame in square millimetres	8.
Section of the connecting-bar in sq.millimetres	20.

NEGATIVE PLATES

Number	11
Dimensions in centimetres:	
Height	18.3
Width	10.3
Thickness	0.4

Weight in kilogrammes	0.44
Weight of frame in kilogrammes	0.18
Weight of the active material in kilogrammes	0.26
Section of the frame in sq.millimetres	8.
Section of the connecting-bar in sq.millimetres	20.
Distance between adjacent plates in millimetres	4.

CELL AND CONNECTIONS

Exterior dimensions in centimetres:	
Height	24.
Length	18.
Width	11.3
Weight of the cell in kilogrammes	1.7
Weight of the insulating members separating the plates (kilos)	0.35

ELECTROLYTE

Weight in kilogrammes	2.2
Approximate volume in cubic decimetres	1.8
Density:	
End of charging	1.26
End of discharge	1.16
Total weight of complete element in kilogrammes	13.5

The Pope Storage Battery

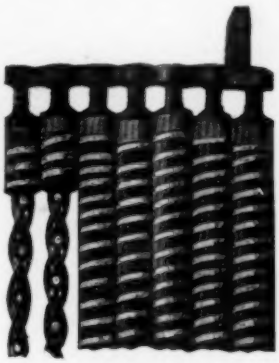
THE Pope accumulator, in the arrangement and form of its electrodes, recalls the Phenix storage-battery.

The positive plates are composed of a series of nine cylinders, 13 mm. in diameter, the upper ends of which are soldered to a cross-piece which carries the connecting-bar for the positive and negative plates. At their lower ends the cylinders are connected by a thin strip of lead, which merely serves the purpose of strengthening and stiffening the construction. Each of the cylinders is composed of a paste layer covering a slag lead core having the appearance of a spirally-twisted, perforated band. The paste completely covers the twisted core. The active material is held in place by a thin, outer band of ebonite, which is embedded in the mass. The band covers about one-half the exterior surface of the active material.

The leaden core is provided at its upper end with a round rod soldered to the cross-piece, and is riveted at its lower end to the lead strip already mentioned.

The leaden bar which connects the nine cylinders carries the connecting-bar.

The negative plate is composed of a light lead grid containing the active material. The grid is surrounded by a frame of small cross-section, provided with three longitudinal cross-pieces. The bars of the grid are of very small cross-section and divide the grid into 42 rectangles 50 mm. × 60 mm. in size. The vertical



Positive Electrode,
Pope Battery

Negative Electrode,
Pope Battery

side of these rectangles is the longer. The connecting-bar is cast on the frame.

The positive plates are inclosed in a perforated ebonite casing which serves as the usual insulated separating means for adjacent plates and finds its counterpart in a similar ebonite casing inclosing the negative plates.

The volume of the electrolyte is equal to 875 grammes of free acid ($H_2 S O_4$).

The containing vessel is made of ebonite, and is covered by a wooden closure provided with two rectangular openings for the passage of the connecting-bars, and with a circular opening closed by a plug, for the escape of the gases.

POSITIVE PLATES

Number	8
Dimensions in centimetres:	
Height	20.
Width	11.5
Thickness	1.3
Weight in kilogrammes	1.12
Section of the connecting-bar in sq. millimetres	28.

NEGATIVE PLATES

Number	9
Dimensions in centimetres:	
Height	20.
Width	11.5
Thickness	0.5
Weight in kilogrammes	0.6
Weight of the frame in kilogrammes	0.25
Weight of the active material in kilogrammes	0.35
Section of the frame in sq. millimetres	5.
Section of the connecting-bar in sq.millimetres	20.

CONTAINING CELL AND CONNECTIONS

Dimensions in centimetres:	
Height	26.5
Length	20.7
Width	13.2
Weight of cell in kilos	1.27

ELECTROLYTE

Weight in kilos	2.34
Approximate volume in cu. decimetres	1.85
Density:	
End of charging	1.28
End of discharge	1.24
Total weight of complete element in kilos	20.

(To be continued in next issue)

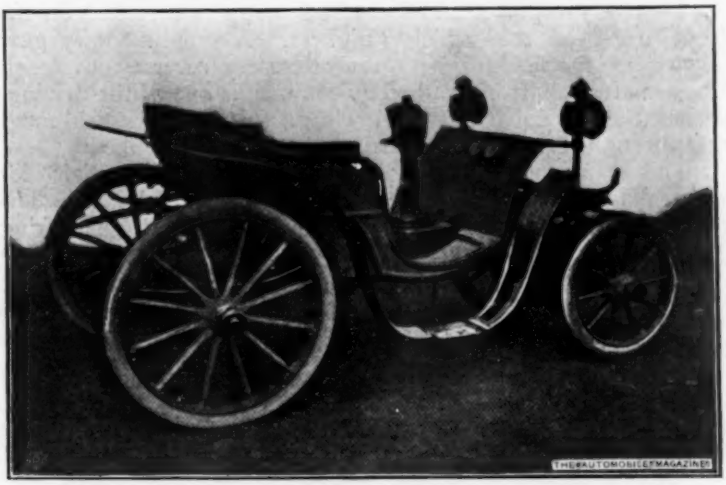


Fig. 1

The Berthier Electric Fore-Carriage

THE illustrations which we present herewith picture a new electromobile which is remarkable chiefly for its novel motor and for the arrangement of that motor and its accessories upon the fore-carriage.

The field-magnets of this motor turn in a direction opposite to that of the armature. The actual speeds are small; but the apparent speed (the sum of the two speeds) is apparently very high. The arrangement has the merit of reducing the weight by reason of the suppression of the differential, of transmission-gears, of intermediate shafts, frame-work, and the like. The lack of differential and transmission gearing naturally lowers the cost considerably. By reason of the opposite rotation of the field-magnets and the armature, the speed of the moving parts is reduced by one-half that ordinarily met with in automobiles. But this is not all; the speed is still further lowered by making the motor a four-pole machine. A two-pole machine of equal capacity would have a speed of about 800 revolutions per minute; but

the armature of the motor in question turns only at 200 revolutions.

This very compact and low-speed motor is mounted on the front truck of the vehicle (Fig. 3). A supplementary gear imparts to the field-magnets the necessary reverse movement. The armature-shaft hence directly commands one of the driving-wheels, the other driving-wheel being actuated by the field-magnets through the medium of a reversing-gear.

This combination consequently acts as a differential; for which reason the usual differential can be dispensed with. The reduction of speed and the suppression of transmission gearing has the effect of increasing the efficiency.

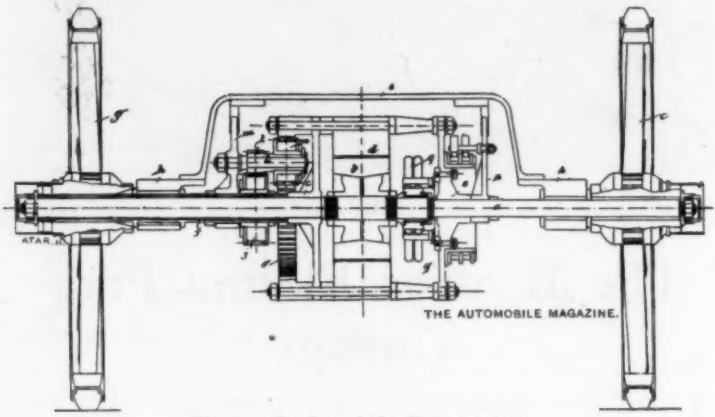


Fig. 2. Section of the Fore-carriage

The arrangement operates without noise and vibration; and the absence of unnecessary parts increases the durability as well as simplicity of construction. Since the motor is directly mounted on the axle of the front wheels, the simplest imaginable fore-carriage is created—a fore-carriage which can be applied to vehicles of almost any kind.

The reversing-gear of the motor, as shown in Fig. 2, is composed of a gear-wheel *O*, meshing with a pinion *n*, the movement of which is transmitted in the opposite direction to the wheel *J*, through the medium of a second pinion. The two pinions are mounted on the same shaft *l;* and the two wheels *O* and *J* are centred on *a*, the principal or main shaft of the entire system.

The motor is of two horse-power, and operates under a poten-

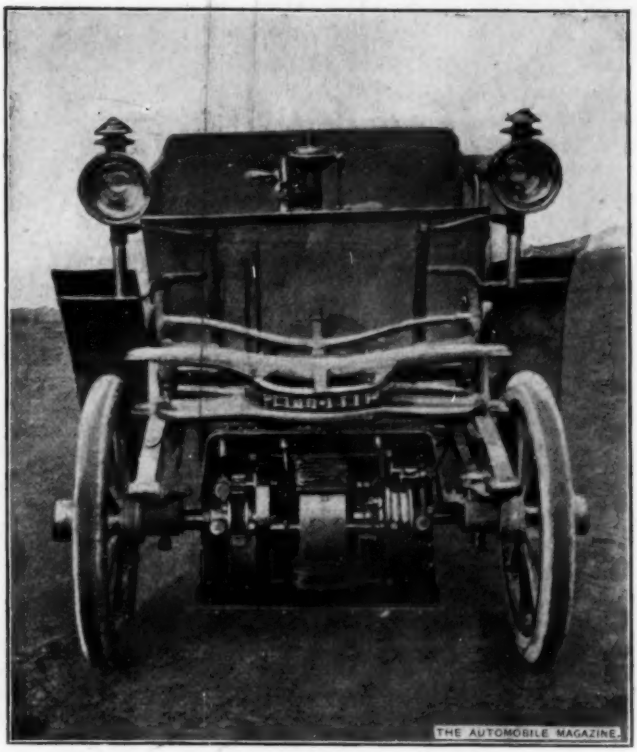


Fig. 3. The Motor and Reversing Gear

tial of 65 volts. The current is fed by means of two metallic disks and two brushes, seen to the right in Fig. 3.

The starting, regulating, and steering levers are carried by a strong central standard, as illustrated in Fig. 1.

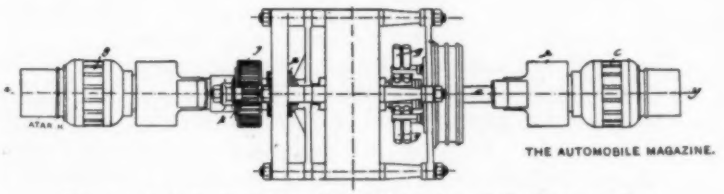


Fig. 4. Longitudinal Elevation and Section of the Fore-carriage

The Kainz Motor

THE Kainz Gasoline-Motor Voiturette constructed by Josef Kainz, of Vienna, is a very simple form of a self-propelled vehicle. The motor, placed on the front of the vehicle, is a vertical one-cylinder type, running at the rate of about 1,200 revolutions per minute and has 3½ horse-power.

The novel feature of this motor is the water cooler jacket. The weight of the motor with its cooler is 40 kilograms.

The power is transmitted by cog wheels to the rear axle and gives the vehicle a speed of thirty kilometres per hour. The change of speed gearing and reserve is secured with only one friction clutch, working on the engine shaft, so that when running idle the engine is perfectly free. This mechanism is secured in a small gear box. The complete vehicle weighs barely 250 klg. The motor is covered by patents in all countries.

The Automobile
MAGAZINE
An *ILLUSTRATED* Monthly

VOL. II NO. 4 NEW YORK JULY 1900 PRICE 25 CENTS

The AUTOMOBILE MAGAZINE is published monthly by the United States Industrial Publishing Company, at 21 State Street, New York. Cable Address: Induscode, New York. Subscription price, $3.00 a year, or, in foreign countries within the Postal Union, $4.00 (gold) in advance. Advertising rates may be had on application.

Copyrighted, 1900.

Entered in the Post Office at New York as second-class matter.

Editorial Comment

THE FUTURE OF ELECTRICITY IN AUTOMOBILE PRACTICE

The electric vehicle, or the electromobile, as it is conveniently called, is at once one of the most convenient and one of the most difficult forms of the motor-carriage. In cleanliness, ease of management, and safety it has ideal qualities. In its present shape its great cost, its excessive weight, and the various shortcomings of the storage-battery, together with its extremely limited radius, combine to limit its field to certain forms of urban use—in which, however, its merits so far outbalance its defects as to make it invaluable in those provinces, and as yet unrivalled by other forms of power. But these limitations make it the least flexible of all types.

The storage-battery, of course, is the source of all the above-mentioned drawbacks. The ideal electromobile would be something at once simple and durable, and in weight so light that that factor would have no more of a handicapping effect than does the weight of the water and fuel carried by existing steam and gasoline types. If, for instance, a metal like aluminum could take the place of lead in the plates of the storage-battery, so great a

reduction of weight would follow that the desired end could probably be attained. It may safely be assumed that, with all the inventive talent that is now concentrated upon the problem of electric motive-power, the ideal will sooner or later be reached. Mechanical genius knows no such word as fail, and, short of perpetual motion, there are few dreams of the inventor that the world is not likely eventually to know as a reality. The history of mechanical progress teems with instances of achievements that expert authorities had pronounced absolutely impossible. Therefore we may count upon the practical development of the electric automobile in what is now regarded as an ideal shape: light, strong, cheap, durable and perfectly tractable. How soon this result will be reached depends upon how soon the basic problem is solved—the development of a perfected storage battery or a substitute therefor—possibly in some way now hardly dreamed of; perhaps even doing away with any necessity for what is called "storage." Such ends may be achieved at any moment, or years may yet pass before the key is found. Undoubtedly great improvements in the electric automobile are steadily developing; the fact that the electric carriage of to-day is so enormously better than that of three or four years ago indicates a steady progress that must bring the goal within reach.

Various important improvements in storage-battery construction are announced from time to time. How many of these will stand the test of practical use remains to be seen. Claims are made, for instance, of great advances in efficiency. This means a considerable increase of electric output for a battery of given size and weight. Should this prove true the consequences will be immensely important. Should, for example, the capacity of a storage-battery be doubled, it would follow that either an electric vehicle of a given weight would be able to go twice as far as at present without recharging, or that its weight could very greatly be reduced and the radius remain the same.

If frequency and ease of recharging were made practicable, length of radius would become a comparatively unimportant factor, and weight could be enormously reduced. It is conceivable that improvements in efficiency and form might be carried so far that the weight of the battery could be made but a fraction of what it now has to be. In that event the storage-battery would cease to be a handicapping factor and extremely light forms of electric vehicles would be universally introduced. With the comprehensive organization of services that is a feature of our modern industrial development, series of recharging stations will be installed at frequent intervals throughout populous

regions. Such series are now proposed for France, and for the great cities and their suburbs in this country. Moreover, it should not be long before compactly populous States like Massachusetts, Rhode Island, Connecticut, and New Jersey, have charging stations in every part, so that electromobiles could go almost everywhere and find a charging-station somewhere within their radius of action. These States are gridironed by electric trolley lines, and there are electric lighting systems in nearly every town. These street-railway and electric-lighting companies could add a highly profitable feature to their business by establishing departments for automobile recharging. The vogue of the electric vehicle would thereby be immensely increased. It might be worth while for the great Electric Vehicle Company to include among its sub-companies a universal company for providing electric power for automobiles, making contracts with local companies everywhere to supply electricity at frequent charging-stations. With electricity supplied at low, and yet profitable, rates, its use would be greatly encouraged. Such a service would be particularly beneficial to lighting companies, for it would increase the daylight use of their plants, and they could afford to supply the current at correspondingly low rates. It is not impossible that methods will be devised for greatly accelerating the charging-process, so that batteries could be recharged as expeditiously as a tank is filled with water. It seems likely that electric "hydrants," so to speak, will in time be established at intervals of every block or so, in a city, with some form of "coin-in-the-slot machine" attachment, so that on the deposit of a nickel or a dime any privately owned automobile may couple onto the main and receive a supply of so and so many watts. Cabs, or other vehicles belonging to a company, could be supplied through the use of a special key to the hydrant. With a process of rapid charging a very low radius would be practicable in a city—say no more than four or five miles—and the vehicle could be made correspondingly light in construction. Less weight would mean lower cost. With such facilities a cab could be recharged while waiting for its user to make a call or do shopping. At every carriage-stand, also, there would be a charging-station.

A Possible New Form of Battery

There is a direction for battery development in which little has yet been done, but which seems to offer great potentialities in automobile practice. It is not exactly a storage-battery, and yet it is one, in a certain sense. What we call a storage-battery is

technically termed a secondary battery. Its construction is such that it has to be acted upon by electricity before it is capable of generating electric energy. The ordinary battery is called a "primary battery"; for it generates electric energy as soon as the elements composing it are assembled and connected. In both cases electricity is generated as a result of chemical action, a sort of combustion process being set up among the materials forming the battery, just as by the more rapid combustion of fuel energy is developed as the effect of heat.

The secondary battery, therefore, does not store up electricity in the sense that coal or grain is stored in a bin. For there appears to be no such thing as electricity, considered as a substance; electricity being simply a form of energy—an effect and a cause, but not a material like water or air, conducted through pipes. It is, however, a storage-battery in the sense of storing electric energy, just as mechanical energy is stored in a spring, or as the energy of heat is stored in a reservoir of hot water. The electric current passing through the battery acts upon the materials of which it is constituted and produces chemical transformations, making them capable of acting upon each other; thereby developing energy just as the materials composing a primary battery act. In this way the equivalent of the energy contained in the current is stored in the re-arranged materials forming the battery, minus the losses attendant on the process; losses analogous to the loss of mechanical energy by friction. When the cells have been wholly or partially exhausted of the stored energy the application of a fresh current of electricity sets up a regenerating process, restoring the materials to the arrangement that makes them capable of renewed action. This process may continue indefinitely, and in the secondary battery we therefore have an immensely valuable instrumentality for the storage of electric energy, vastly enhancing the efficiency of plants for lighting and power by distributing the load upon the generating mechanism more uniformly through the twenty-four hours. The great drawback to its use for traction purposes lies in its extreme weight.

The new form of storage-battery, as we may call it, is a primary battery. Some years ago it was discovered that in a certain form of battery, in which zinc was one of the main constituents, when the battery was exhausted the consumed zinc could be recovered by running a current of electricity through the cells in a reverse direction. The zinc could then be used over again, and it would represent the equivalent of the electric energy employed in its recovery. The energy stored up in the recovered zinc would

therefore make a storage-battery of this form of primary battery. An additional link in the series is necessary, however, before this discovery can be turned to practical account. The oxidizing agents employed in the battery are not recovered, and these represent a considerable portion of the total cost. It is therefore essential that one of two things should be done before the idea can be made commercially available. Either the process of recovery must be extended so as to include that of the oxidizing agents as well as the zinc, or these agents must consist of some very inexpensive material, the non-recovery of which would cut no figure. Probably one or the other of these two results will some time be reached, and then we shall have a storage-battery so slight in weight as to make the electric-vehicle a very light affair, and correspondingly cheap, both in construction and operation.

Electric Vehicles Without Battteries

There is one way, however, in which it may be practicable to run electric automobiles without any batteries whatever. It would, to be sure, be feasible only under certain limited conditions, but still it might include a very large and important range of functions. The most successful form of electric traction is the trolley car. Why not a trolley carriage as well, without any rails? It is by no means a new idea; some interesting experiments with a trolley carriage, or wagon, were conducted at Hartford several years ago, and at the time it was said that the results were promising. The proposition is essentially an easy one, amounting merely to the same thing as a trolley-car system without any rails; that is, a trolley-wire stretched along the regular highway and supplying the current to vehicles equipped with motors alone. The Hartford experiment was tried shortly before the vogue of the automobile. Had it taken place recently, it would have attracted wide attention.

With organization on a large scale such a scheme might be made enormously successful. Various difficulties would first have to be overcome. First would be that of keeping the trolley in place against the wire. This is sometimes troublesome in the case of an electric car; but the difficulties would be enormously greater with a vehicle having no rails to guide its course and moving freely about the road, sometimes on one side, sometimes on the other, and hence now nearer the conducting wire and now farther away. In the Hartford experiment, however, these fluctuating movements are said to have been allowed for and made feasible. But perhaps this might not have been the case in practical operation.

Then there are the difficulties of providing for the return current, which, in the case of a street-railway, runs by way of the wheels to the rails, and thence by buried wire back to the generating-station. With rubber tires and the absence of rails there would be obstacles in the way of the free return of the current. A double trolley, however, might provide for this. Again there is the difficulty presented by slow-moving vehicles obstructing the progress of faster ones; something that might be overcome either by frequent turnout points, with the conducting wire arranged as at switches on an electric railway, so that at such points the faster vehicles could run ahead of the slower and be subjected to no serious delay, or by small auxiliary storage-batteries that would keep enough power accumulated to run short distances independent of the trolley.

An electric trolley-carriage could not go everywhere, like a carriage carrying its own motive-power. Its course, like that of a trolley-car on an electric railway, would have to be confined to certain city streets and to main-traveled highways in the country. But even with such limitations it could be exceedingly useful. Electric transit lines in cities and from town to town in the country might thus be cheaply established without the expense of constructing and maintaining a costly railway line. Private individuals having occasion to go to and fro over regular routes every day could also use it to advantage for their vehicles, and it would be immensely serviceable in freight traffic. A transportation company having no track to maintain could afford to make its rates correspondingly low, and the public would gain accordingly.

With the advantages of the principle once demonstrated it would pay to equip the fine systems of State highways in Massachusetts and New Jersey, and the excellent roads that are such a credit to Long Island, with trolley plants. This might be done either by the State itself or by private companies given franchises for the purpose. In cities and towns with local electric-lighting companies or municipal lighting plants the same thing could be done, and trolley-vehicle routes established through all the principal streets. As in the case of the system of electric charging-stations for automobiles, heretofore mentioned, this would create a great daylight demand for electric power, the load on the plant would be evenly distributed and the current could be supplied much more cheaply, much to the benefit of all classes of consumers. The amount of electricity delivered to each vehicle could be accurately registered by meter, and paid for accordingly. Instead of an overhead trolley-line, to which there are serious objections on the score of looks and otherwise, it is

not impossible that eventually some system may be devised whereby the current will be distributed along the highways in underground electric conduits and picked up by passing vehicles as required. The great economies that would characterize the trolley principle as applied to electric vehicles—as in the distribution of power from a central plant where it is generated on a large scale and at a correspondingly low cost, and in the lightness of construction and corresponding cheapness both in first cost and in operating charges—should appeal to capital so strongly as to make it worth while to undertake its application on some favorable route; establishing an omnibus service either in some large city or over some frequented and well constructed road in the country running between two populous points.

The foregoing indications of the course of development that may attend electric automobile practice, furnish ample ground for confidence that the future of the electric vehicle is rich in promise of a great and healthful growth, while there appears to be no prospect that it will supplant the other forms of motive-power that have now established themselves so strongly.

The Making of Parts for Automobile Construction

In the early stages of automobile manufacture in this country there has naturally been a painful lack in the special manufacturing of necessary parts. Progress has been much hampered by this deficiency; with specialized work the number of automobiles now in use would be several times as great as they are. Makers have not known where to turn for this and that thing needed in their work. They would gladly have obtained it ready made, if possible, but they could not, and so they have had to make it themselves, much to the complication and retardation of their production. Slowly and surely the desired change is coming about. This country is peculiarly a country of specialized manufacturing. The automobile industry will be no exception to the rule, and in a comparatively short time we shall see manufactories of motor-vehicle parts springing up everywhere. There are few things that will more advance the general introduction of the automobile than this. The history of the bicycle industry shows what may be expected in automobile production. Even the greatest concerns that manufactured nearly everything in connection with their bicycles did not do it directly, but had subcompanies for making this and that part; a rubber-company for

manufacturing the tires, for instance, and a tube-company for making the tubing. And beside using the output in their own machines, they supplied the trade at large very extensively. The automobile trade is taking a similar direction. Beside the great establishments that make nearly every part of the automobile in their own several works, there are numerous concerns—many of them of minor importance and many of very considerable magnitude—which have to depend on the makers of individual parts. It is very poor economy for parties who have taken up some valuable improvement in the automobile to dissipate their energy by attempting to manufacture complete, with the improved device as a special feature, instead of limiting themselves to manufacturing the improvement and supplying the trade with it—a work in which they would find they had all they could do. Makers will go to carriage-builders for their bodies, to wheel-makers for their wheels, and to different manufacturers for their motors, their storage-batteries, their tires, and so on down to the various minor parts. It having been known that one of the greatest industrial establishments in the country was experimenting extensively in automobile work, it has been widely reported that it was about to embark in the manufacture on an enormous scale. But this proves to be unfounded. The concern, having devoted the energies of its splendid engineering staff to the production of certain improved types of the automobile, and having secured patents on the various improvements made, proposes to content itself with manufacturing the motive-power, which is its own particular province, and, furnishing the patterns of the vehicles to various makers, license them to manufacture them, finding its profit in the royalties and more particularly in supplying the motive-power machinery.

The enterprising course of three young men we know of, employed in a great manufacturing establishment, indicates what will soon be going on in all industrial parts of the country, furnishing the basis for great advances in automobile work. They are inventive young fellows of decided mechanical talent, and perceiving that there will be a large demand for something of the kind, they have designed an excellent form of gasoline engine. The castings of this they supply to the trade to be finished up in machine shops here and there according to careful drawings which they furnish. Such motors are, of course, in great demand, and since the makers supply something in which the trade can place confidence for assured excellence, the reputation gained promises to assure them a large and growing business. Meanwhile they have employed their leisure in building admirable

automobiles for their own use, with the aid of the parts that they have been able to assemble here and there, and they will have a great deal of wholesome enjoyment therefrom.

The making of automobile parts is certain to found various extensive industries in this country and create a vast amount of new wealth. A great trade will also develop in the production of automobile accessories, as it has so notably in the case of the bicycle. It is, of course, inevitable that standards will soon be agreed upon in all these specialties, greatly to the mutual convenience of the makers and the good of the public at large.

Automobile Market-Wagons

Whoever has seen or heard the long strings of heavily laden market-wagons lumbering their toilsome way into a great city in the wee small hours of the day, moving at a pace slower than cold molasses, will appreciate the improvement that will come with the application of the automobile to that phase of transportation. These heavily burdened teams are powerful factors in wearing out the highways, and in these days theirs is a most wasteful form of locomotion. A good strong automobile market-wagon could be constructed with sufficient motive-power to take two or three of these ordinary wagons behind it in a train and move over the ground at least twice as fast, enabling marketmen to set out at a much later hour and yet arrive with their produce at the same time as before. The cost of transportation would also be very greatly reduced. One automobile wagon would do the work of a considerable number of horses. The introduction of the forecarriage, which can be speedily manufactured and applied at once to existing vehicles, would greatly accelerate the change in fields of transportation like this. There is such a manifest demand for the device that its manufacture in this country should be a highly profitable undertaking.

The Reckless Driving Nuisance

In France the reckless conduct of automobilists on the road has reached the degree of a public nuisance and called for stringent regulating measures. In this country "the boot is on the other leg," so to speak; it is the automobilists who have to complain of the reckless actions of the drivers of horses. In France the offenders are chiefly persons who use motocycles; here there are few motocycles in use, as yet, and those who run them are, as a rule, as careful as the drivers of the larger automobiles. But

the careless actions of a large proportion of the drivers of horses has long been a matter of complaint, and now, with the increasing use of the highways for other forms of traction, it has become extremely perilous. With the multiplication of bicycles horse-drawn vehicles have for some years been in a decided minority on the roads of a large part of the country, including all populous sections. With the present rapid development of mechanical traction it is evident that very soon new regulations for the use of the highways, adapted to the new order of things, will soon have to be made and rigidly enforced.

In England highway traffic is very strictly regulated. Accordingly, the era of mechanical traction is signalized in its progress by comparatively little friction in its contact with the old order. In London, for example, the crowded and comparatively narrow streets, simply by rational regulation, are made to accommodate a vast amount of traffic. In our great American cities the same streets, if subjected to a similar degree of use, would be hopelessly congested. Judicious police regulation accomplishes this end. Traffic is compelled to follow very strictly the rules of the road; the currents of vehicles passing in opposite directions are kept to their respective sides of the way as definitely as if separated by a wall. Any departure from the rule in the slightest degree, even in little deviations which with us would be made as a matter of course, inevitably gets a driver into trouble.

But in our great cities there is a helter-skelter occupancy of the streets that with simply a comparatively moderate degree of use confuses traffic even in ample thoroughfares. There appears to be no idea of what the rules of the road call for. People drive to the right or the left according to their whim. In turning, many persons are liable to go indiscriminately either one way or the other; in consequence when an automobile is following such a vehicle and using the utmost caution he is liable to run into it. Another source of vexation and danger proceeds from horses commonly driven in pairs, but occasionally hitched singly. If such a horse has been driven on the "off" side his tendency is to keep well on the left of the road, greatly to the inconvenience, and even danger, of traffic in the opposite direction. One of the most common of practices, and something in which the horse sins equally with the driver, is the general custom of violating the rule of the road by cutting sharply across corners when turning into a connecting street running at right-angles. When a vehicle is coming in the opposite direction at such a point a collision is inevitable.

Editorial

Under present conditions the prudent automobilist will not tempt Providence by going out in a large city on a Sunday afternoon, when butchers, grocers, etc., who know little about driving, hitch their commercial horses into a buggy and rattle their reckless way through the streets. A common cause of trouble for an inexperienced driver, and even many who should know better, is the tendency, at the approach of an automobile, to give the horse a fright by suddenly yanking at the reins, thus warning him to look out for something horrible. In reality the driver scares his own horse more than the automobile does. If the driver would keep steadily on the chances would be in favor of his horse taking the matter coolly.

A REMARKABLE FEAT

The remarkable thousand-mile run of the Automobile Club of Great Britain has been marked by one of the most extraordinary feats yet accomplished in the history of the new form of transit. One of the most expert of the participants was Mr. Grahame White, who drove a Daimler automobile from Paris. It appears that when about 17 miles north of Alnwick Mr. White good-naturedly permitted one of his companions to try his hand at steering. In consequence the party was ditched and the bracket of the steering-gear was broken. They were 52 miles from the end of the day's run, but it occurred to Mr. White that by resorting to steering with his foot they might get on. So, just as a skillful seaman with crippled rudder navigates his craft by steering with his sails, raising or lowering them according to change of direction desired, so Mr. White rested his left foot on the off step and kept his right on the off front wheel. In this manner he steered his carriage all the way to Newcastle. He did not proceed at any snail's pace, either. For the whole 52 miles he averaged 10 miles an hour, passing over several steep hills, applying the brake two or three times, and stopping fifteen minutes for tea at Morpeth, attending meanwhile to the manipulation of valves, etc. Both cool head and skillful hand—not to say foot—are demanded for such work. It was a feat of the feet, so to speak, as well as of the head.

Automobile Clubs

NOTHING indicates more clearly the rapid rise of automobilism than the gradually-increasing number of clubs formed by *chauffeurs.* Casting an eye to France, we find first of all the *Automobile Club de France,* with its membership of 2,200. In the provinces automobile clubs are to be found in the following cities: Bordeaux, Pau, Toulouse, Périgueux, Nizza, Marseilles, Salon, Béziers, Avignon, Romans, Grenoble, Lyon (two), Clermont, Ferrand, Dijon, Lons-le-Saunier, Nancy, and Rouen. In all there are eighteen French organizations.

In Belgium there are five clubs, distributed in Brussels, Liège, Charleroi, Antwerp, and Flanders. In England there is only the Automobile Club of Great Britain and Ireland, the five sections of which are located, respectively, in London, Birmingham, Dublin, Edinburgh, and Liverpool.

The Swiss Automobile Club has its headquarters in Geneva and has 300 members.

The Italian Automobile Club is distributed in the cities of Turin, Milan, Venice, and Florence.

Besides the Austrian Automobile Club, there are in Austria a few organizations in Graz, Budapest, Innsbruck, Prague, and in the resorts near Vienna.

Germany has its *Deutscher Automobil-Klub* and also clubs in Aix-la-Chapelle, Dresden, Frankfort, Munich, Stettin, and Stuttgart.

Holland's single club is located in Nymwegen. Spain has an organization in Madrid; and Russia clubs in St. Petersburg and Moscow. If to this list be added the Automobile Club of America, whose home is in New York, it will be seen that the number of motor-carriage associations bids fair to rival our one time numerous bicycle associations.

Other American cities boasting of automobile clubs include Philadelphia, Chicago, Baltimore, Rochester, Paterson, Columbus, Cleveland, Cincinnati, Minneapolis and San Francisco.

By the foreign clubs the Automobile Club of America is the recognized corresponding club and authority in matters of national and international transaction.

Book Notices

Dunod, of Paris, has just issued a neatly-printed pamphlet entitled *Les Automobiles à Pétrole,* which is a very admirable treatise on the petroleum automobiles so widely used in France. The author of the book, L. Bochet, has treated his subject with a praiseworthy care and discretion. What he describes is told as briefly and as clearly as possible. No words are wasted; nor are there any involved technical descriptions of impracticable appliances and apparatus. Although the book contains no information which has not been previously imparted by other treatises, it is nevertheless a valuable contribution to automobile literature, and as such is well worth reading.

La Traction Mécanique et les Voitures Automobiles, by G. Leroux and A. Revel, has been sent to us by the publishers, J. B. Baillère and Son, of Paris, France. The book contains 394 pages of reading-matter and 108 illustrations. The authors discuss in turn steam, compressed-air, and gas tramways, as well as electric and cable roads. Three systems of steam traction are described, and various systems of electric traction are discussed, such as the overhead wire, surface contact and storage-battery methods of electric transportation. The last three chapters are devoted to a description of the principal types of automobiles now in general use.

In a fine octavo volume containing 481 pages, embellished with 234 cuts, MM. E. Aucamus and L. Galine have discussed anew the subjects of tramways and automobiles. The various forms of traction have been methodically treated, each system being well defined from other systems of similar character. The most recent foreign and French inventions, as well as important tests and trials, find a place in the volume. In the chapter on the automobile, the authors have kept well abreast of the times and have very wisely selected for discussion only those types of vehicles which have withstood the test of actual use. The book is more technical than most automobile-treatises, and for that reason will be read chiefly by men who are apt to regard the motor-carriage not as an ordinary vehicle to which a motor has been applied, but as a power-driven contrivance in which the strains and stresses must be calculated with the same nicety as in a bridge or other framed structure. The mathematical formulas and demonstrations found in the book are such as all engineers employ in their work. *Tramways et Automobiles* is no popular book; it is intended for men who are thoroughly familiar

with modern constructional methods, and for that reason, discusses its subjects with an exhaustiveness which cannot be expected of a work written for general reading. The book, it should be added, comes from the publishing-house of Vve. Ch. Dunod, of Paris, France.

The first issue of a unique publication known as the *Road Maker* made its appearance in May. As may be inferred by its title, "good roads" is the burden of its song. In introducing itself the *Road Maker* says:

"The need of such a journal as we propose to publish is apparent to all observers of American highways. It must be clear to any one at all familiar with correct methods of road building and road repairs that the present unsatisfactory condition of our roads is chiefly due to two causes. First, to the lack of knowledge of the true principles of road making on the part of those to whom the care of our roads is entrusted, and second, to the improper laws under which our officers are compelled to operate. It is no more reflection on the average officer's intelligence to say that he is not a road builder than to say that he is not a doctor or a lawyer, for road building is an art based on scientific principles that cannot be acquired without much study and reflection. We realize that to the average busy road officer this is no easy task, as the information he must seek is scattered through scientific treatises, much of which can only be found in pamphlet form in the transactions of various scientific societies, where it is buried in a mass of technical matter that is mere rubbish to most busy men. We propose, therefore, to sort out this matter and publish the valuable parts in such practical form that 'he who runs may read,' understand and put into practice the best principles of the road maker's art."

The *Road Maker*. Monthly. Illustrated. The Road Maker Publishing Co., Port Huron, Michigan.

The Automobile Index

Everything of permanent value published in the technical press of the world devoted to any branch of automobile industry will be found indexed in this department. Whenever it is possible a descriptive summary indicating the character and purpose of the leading articles of current automobile literature will be given, with the titles and dates of the publications.

Accumulators—

Competitive tests of accumulators by the Automobile Club of France (Concours d'Accumulateurs de l'Automobile Club de France). By A. Bainville. An account of the tests made, with criticisms. "L'Electricien," Paris, April 7, 1900.

Detailed technical description of portable storage batteries for the operation of automobiles. "Automobile," Berlin, May 10, 1900.

A short article relative to a new light-storage battery of European manufacture, attached to a vehicle of new design. "La France Automobile," Paris, April 29, 1900.

A technical description of a new dry battery of German manufacture. "Der Motorwagen," Berlin, May 15, 1900.

A brief description of a new accumulator of minimized weight and cost. "Zeitung für Fahrrad- und Motorwagenbau." Berlin, May 20, 1900.

Advice to Prospective Buyers of Automobiles—

Detailed instructions and rules for amateurs for the buying, care and proper use of automobiles. "Le Chauffeur," Paris, May 11, 1900.

Alcohol Motor—

A description of an alcohol motor of European invention. With four illustrations. "The Automobile Magazine," June, 1900.

Aluminum and Partinum—

A brief review of the possibilities of the metals in the manufacture of autocarriage bodies. "The Automotor Journal," London, May, 1900.

A New Value for Explosion Motors—

A recently patented device of European invention. "The Motor Age," Chicago, May 3, 1900.

Automatic Boiler Feed—

A technical description of a new device of American invention. With one illustration. "The Motor Age," Chicago, May 3, 1900.

Automatic Interrupter—

A technical description of the new Rochefort interrupter, designed for exploding the mixture in the interior of the cylinder. "L'Industrie Automobile," Paris, May 25, 1900.

Automobile Construction—

Detailed recapitulation of the general views of one of the best known French manufacturers of automobiles, regarding modern automobile construction. "Das Journal für Wagenbaukunst," Berlin, April, 1900.

Automobile Lamp—

Technical description of a new automobile lamp, operated on a new principle of carburated air. "Le Chauffeur," Paris, May 11, 1900.

Automobiles—

A technical description of different types of "Pieper" gasoline and electric carriages. With one illustration. "El Automovilismo Ilustrado," Barcelona, May 15, 1900.

A brief description of an improved chainless carriage of European manufacture. With one illustration. "The Automotor Journal," London, May, 1900.

A description of a new gasoline vehicle of American manufacture. With one illustration. "The Motor Vehicle Review," Cleveland, May 15, 1900.

The Automobile of To-day in Europe and America. Henry Sturmey. Read before the Automobile Club of Great Britain and Ireland. Reviews the advances made, the types used, the progress in different countries, etc. "Automotor Journal," London, Eng., April, 1900.

Automobile Spring Bearing—

Technical description of recent American invention. With one illustration. "The Motor Age," Chicago, May 3, 1900.

Automobiles as a Source of Revenue for Electric Stations—

A paper read before the National Electric Light Association, Chicago, May 24, 1900. "Electrical Review," June 6, 1900.

Axle-tree Motor—

An illustrated technical description of the new axle-tree Chaboche motor. "La Locomotion Automobile," Paris, May 31, 1900.

Boring Mills—

A special machine adapted to the manufacture of automobile parts. With one illustration. "The Motor Age," Chicago, April 26, 1900.

Carbureters—

A brief article on a new carbureter devised by Ch. Le Blon. "Le Chauffeur," Paris, May 11, 1900.

A description of a special device of European manufacture, designed for voiturettes. With one illustration. "The Autocar," Coventry, May 26, 1900.

Descriptions of new carbureters of European manufacture. With illustrations. "L'Industrie Automobile," Paris, May 25, 1900.

A description of a simple form of carbureter of European invention. With one illustration. "The Autocar," Coventry, May 26, 1900.

Clutches for Automobiles—

A description of double and triple friction clutches of European manufacture. With two illustrations. "The Motor-Car Journal," London, April 20, 1900.

Connection Between Motor Frame and Running Gear—

Detailed technical description of a new invention, by which the motor is rendered independent of the carriage body with respect to flexibility and tension. With two illustrations. "Zeitung für Fahrrad und Motorwagenbau," Berlin, April 29, 1900.

Construction of Differential Gears—

A technical article. With one illustration. "The Motor Age," Chicago, April 26, 1900.

Cooling of Motors—

Technical article regarding the importance of this question. "Cycle et Automobile Industriels" (from "Petites annales de l'Automobile"), Paris, May 20, 1900.

Delivery Wagons—

Power Consumption and Operative Cost of Automobile Delivery Wagons. By George F. Sever. A study of the comparative costs of operation and maintenance of horse and electric delivery wagons for city service. "Electrical Review," March 28, 1900.

Electric Automobiles—

A technical article describing the great progress of electrical automobiles, stating the future of same depends less on the increase of power than on the increase of the proportion between power and weight. "Tous les Sports," Paris, May 19, 1900.

A brief description of two new carriages of European manufacure. "L'Automobile," Turin, May 15, 1900.

Serical article on electric generators. With three illustrations. "La France Automobile," Paris, April 29, 1900.

The Automobile Index

Illustrated description of the electric Teantaud automobiles. "L'Avenir de l'Automobile et du Cycle," Paris, May, 1900.

Electric Cab—

A description of a new electric hansom of European manufacture. "Der Motorwagen," Berlin, May 31, 1900.

Electrical Ignition and Gasoline Engines—

An article. By P. P. Nungesser. "Cycle and Automobile Trade Journal." Philadelphia, June 1, 1900.

Electric Mailcoach—

Detailed technical description of the Kühlstein electric mailcoach, carrying eighteen people, built to run between railroad depots in Paris. "Das Journal für Wagenbaukunst," Berlin, April, 1900.

Electric Van—

A technical description of the new electric van of the Paris fire department. "Der Motorwagen," Berlin, May 15, 1900.

Electromotors—

Brief technical description of the Bergmann electromotors. With one illustration. "Automobile," Berlin, May 26, 1900.

French Racing Rules and Regulations—

Summary of racing rules and regulations recently adopted in France, as a result of an accident at St. Germain. "L'Avenir de l'Automobile et du Cycle," Paris, May, 1900.

Generator Valves—

A technical description of valves designed to take the place of carbureters. With four illustrations. "The Motor Vehicle Review," Cleveland, May 15, 1900.

Hydro-carbon Automobiles—

Detailed description of the Mees automobiles. With four illustrations. "L'Avenir de l'Automobile et du Cycle." Paris, May, 1900.

A technical description of a fourteen horsepower gasoline carriage of American invention. With two illustrations. "Cycle and Automobile Industriels." Paris, May 13, 1900.

A brief description of a gasoline physician's carriage of American manufacture. With one illustration. "L'Avenir de l'Automobile et du Cycle." Paris, May, 1900.

"Gasoline automobiles for light delivery service." An article. "The Hub." New York, June, 1900.

Hydro-carbon Motors—

A technical description of the new Motor de Bouilhac de Bourzac. With three illustrations. "Cycle et Automobile Industriels. Paris, May 20, 1900.

Ignition—

An article on a new system of ignition for gasoline motors, devised by European inventors. With one illustration. "La France Automobile," Paris, April 29, 1900.

A technical article on the system of electric ignition. Illustrated. "La Locomotion Automobile," Paris, May 24, 1900.

A technical description of the new Richard igniter. With two illustrations. "L'Industrie Automobile," Paris, May 25, 1900.

Induction Coil Construction—

An article on the construction of induction coils. With two illustrations. "The Motor Age," Chicago, May 3, 1900.

Injector—

A description of an injector of American manufacture, designed for steam carriages. With two illustrations. "The Automobile Review," Chicago, May, 1900.

International Berlin Motor Exhibition, 1899—

Concluding article of a serical description of carriages exhibited. "Der Motorwagen," Berlin, May 15, 1900.

The Automobile Magazine

Light Carriages—

"The Light Road Carriage." By Edward de Nôreme. Discussing the class termed by the French, "voiturette," illustrating various types and describing the characteristic features. "Automobile Magazine," April, 1900.

Liquid Fuel Burner—

A technical description of a liquid fuel burner recently introduced in Europe. With two illustrations. "The Automotor Journal," London, May. 1900.

Magneto-electric Ignition—

A description of an igniter and timing gear of European introduction. With one illustration. "The Autocar," Coventry, May 26, 1900.

Metal—

A short article on a new American anti-friction metal said to possess remarkable qualities." "Le Chauffeur," Paris, May 11, 1900.

Modern Locomotion—

By Sir David Salomons. A paper read at the meeting of the Anglo-French Association in London May 26, 1900. "The Motor-Car Journal," London, June 2, 1900.

Motocycle—

A technical description of the new Renaux tricycle. With thirteen illustrations. "Zeitung für Fahraad und Motorwagenbau," Berlin, June 3, 1900.

Motor and Controller—

A description of a new motor and controller of American invention. "The Motor Vehicle Review," Cleveland, May 22, 1900.

Motor Carriage—

A description of a new motor carriage of European invention. With four Illustrations. "The Automobile Magazine," June, 1900.

Motors—

A technical description of five new motors of European manufacture. "L'Industrie Automobile," Paris, May 25, 1900.

A description of the new Heffner motor. With one illustration. "La Locomotion Automobile," Paris, May 30, 1900.

A technical description of a new petroleum-spirit motor, of European manufacture. With six illustrations. "The Motor-car Journal," London, June 2, 1900.

A description of a new motor adapted for voiturettes. With one illustration. "The Motor-car Journal," London, May 26, 1900.

A description of a two-and-a-half horsepower motor, of American manufacture, adapted for light vehicles. With one illustration. "The Motor Vehicle Review," Cleveland, June 5, 1900.

A brief description of a new two horsepower gasoline motor, of American invention, adapted for light carriages. With one illustration. "The Cycle and Automobile Trade Journal," Philadelphia, June 1, 1900.

A technical description of a "two-stroke petroleum motor. With six illustrations. "The Automotor Journal," London, Eng., May, 1900.

A description of a new four-cycle gasoline motor of American invention. With one illustration. "The Automobile Review," Chicago, May, 1900.

A technical description of "L'Aigle" motor. With three illustrations. "Le Chauffeur," Paris, May 11, 1900.

A technical description of a hydro-carbon motor of European invention. "La France Automobile," Paris, May 10, 1900.

A technical description of the improved Aster hydro-carbon motor for light vehicles. "Cycle et Automobile Industriels," Paris, May 24, 1900.

A description of a single cylinder balanced engine, operating on the Otto cycle principle, of American manufacture. With two illustrations. "The Motor Age," Chicago, May 31, 1900.

Motor Tricycles—

Detailed description of the Darracq motor tricycles. A new system

of cooling with water, by which the overheating of the cylinder and binding of the piston is avoided. With two illustrations. "Automobile," Berlin, May 10, 1900.

Non-explosive Gasoline Reservoir—

Illustrated technical description of a new non-explosive gasoline reservoir of European manufacture. "Automobile," Berlin, May 10, 1900.

Oil and Gas Motors—

Description of new oil and gas motors of European manufacture. With two illustrations. "The Automotor Journal," London, May, 1900.

Oil Motor—

The Dawson oil motor. A general description explaining the principles, with a detailed account of its construction. Illustrated. "Automotor Journal," London, April, 1900.

Omnibuses—

Automobile omnibuses for service in cities. Describes types used in European cities, illustrating two. "Scientific American," Supplement, April 28, 1900.

Power Transmission—

A technical article on transmission as applied to certain vehicles of recent invention. With five illustrations. "Der Motorwagen," Berlin, April 30, 1900.

Progress—

The practical automobile of the future. By E. E. Schwarzkopf. In praise of the fore-carriage and its economy. Illustrated. "Automobile Magazine," April, 1900.

Running Gear—

A description of new running gear of American manufacture. With one illustration. "The Hub," May, 1900.

A brief description of a new American invention for electric vehicles. With two illustrations. "The Motor Age," Chicago, May 3, 1900.

Sparking Plug—

A description of a new sparking plug of recent European invention. With two illustrations. "The Autocar," Coventry, May 26, 1900.

Speed-changing Gear—

A technical description of a European invention designed for motor tricycles. "L'Automobile, Turin, May 15, 1900.

A progressive change of speed, devised by well-known European manufacturers. "Le Chauffeur," Paris, May 11, 1900.

A speed-changing gear for motocycles of European manufacture. The change of speed is maintained by the movement of a clutch, which is set in motion by direct engagement with the teeth of the pinion. With three illustrations. "Cycle et Automobile Industriels," Paris, May 27, 1900.

A technical description of a new speed-changing gear, operated by an epicycloidal movement. "L'Industrie Automobile," Paris, May 25, 1900.

A brief technical description of a variable speed gear for automobiles. "The Motor-Car Journal," London, April 20, 1900.

Starting Device—

A technical description of a new starting device for motors. With two illustrations. "The Automobile Magazine," June, 1900.

A description of a new automatic starting device by which power is obtained through a reservoir of compressed air holding pressure indefinitely. With four illustrations. "L'Industrie Automobile," Paris, May 25, 1900.

Steam Generator—

A description of a novel "flash" boiler of European invention. With one illustration. "The Automotor Journal," London, May, 1900.

Steam Ram—

A description of a simple device designed to fill water supply tanks of steam carriages. With one illustration. "The Automobile Review," Chicago, May, 1900.

The Vedovelli and Priestly Cab—

A technical description, with two illustrations. "The Scientific American," April 14, 1900.

The Weight of Motor Wagons—

Editorial discussion of the British Light Locomotives Act of 1896. "Engineering," London, March 16, 1900.

Trials—

Motor Carriage Trials. By E. C. Oliver. Describes apparatus for testing automobiles, and the method of conducting such trials so that all conditions shall be kept constant, and results comparable. "The Horseless Age," April 18, 1900.

Tricycles—

A popular article regarding the advantage of the tricycle in opposition to the views of those who disclaim any future for that vehicle. "Motor-Sport," Berlin, April 15, 1900.

Use and Management of the Automobile; What to Expect of it—

A serial article by Henry Sturmey, M. C. I. E. "The Autocar," Coventry, March 31, 1900.

Vaporizers—

The Longuemare vaporizer fully described and illustrated. By L. Berger. "The Horseless Age," April 4, 1900.

Variable Belt Transmission—

Full description and illustration of a novel belt transmission device embodying variable speed and reversing gear of recent American invention. "The Motor Age," Chicago, March, 1, 1900.

Variable-speed Gear—

Some additional technical particulars to an ingenious variable-speed gear. With two illustrations. "The Motor-Car Journal," London, June 2, 1900.

Viameter—

A brief description of an apparatus indicating on the same dial the grade as well as the total distance covered by the vehicle to which it is attached. "La Locomotion Automobile," Paris, May 31, 1900.

Voiturettes—

Brief description of two new types of voiturettes (seating 2 and 4 people, 3½ and 5 horse-power respectively), of European manufacture, "L'Avenir de l'Automobile et du Cycle," Paris, May, 1900.

A technical description of a new voiturette provided with a "Morisse" motor of 3½ horse-power, with a double cooling system, by cast fins (air cooling), and by water circulation, these two systems being absolutely independent of each other. With four illustrations. "La Locomotion Automobile," Paris, May 31, 1900.

An illustrated technical description of a new voiturette of European manufacture, provided with the German Protos motor. "Automobile," Berlin, May 26, 1900.

A brief technical account of a new French system of transmission by cable. With three illustrations. "Cycle and Automobile Industriels," Paris, June 3, 1900.

Brief description of the Antoine voiturette. "The Motor-car Journal," London, June 2, 1900.

A technical description of a new voiturette, of European invention, said to possess remarkable qualities. "La Locomotion Automobile," Paris, May 24, 1900.

A technical description of the Brierre voiturette. With four illustrations. "Les petites Annales illustrées du cycle et de l'Automobile," Paris, May 26, 1900.

A description of a light carriage of European manufacture. With one illustration. "The Automotor Journal," London, Eng., 1900.

A description of a light vehicle of recent European introduction. With six illustrations. "The Automotor Journal," London, May, 1900.

A brief technical description of a new light carriage of European manufacture. "The Motor-Car Journal," London, May 12, 1900.